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August 1996

US Army Corps of Engineers
Waterways Experiment Station

Airfield Pavement Evaluation, Robert Gray Army Airfield, Fort Hood, Texas

by Patrick S. McCaffrey, Jr.

Prepared for U.S. Army Center for Public Works

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Final report

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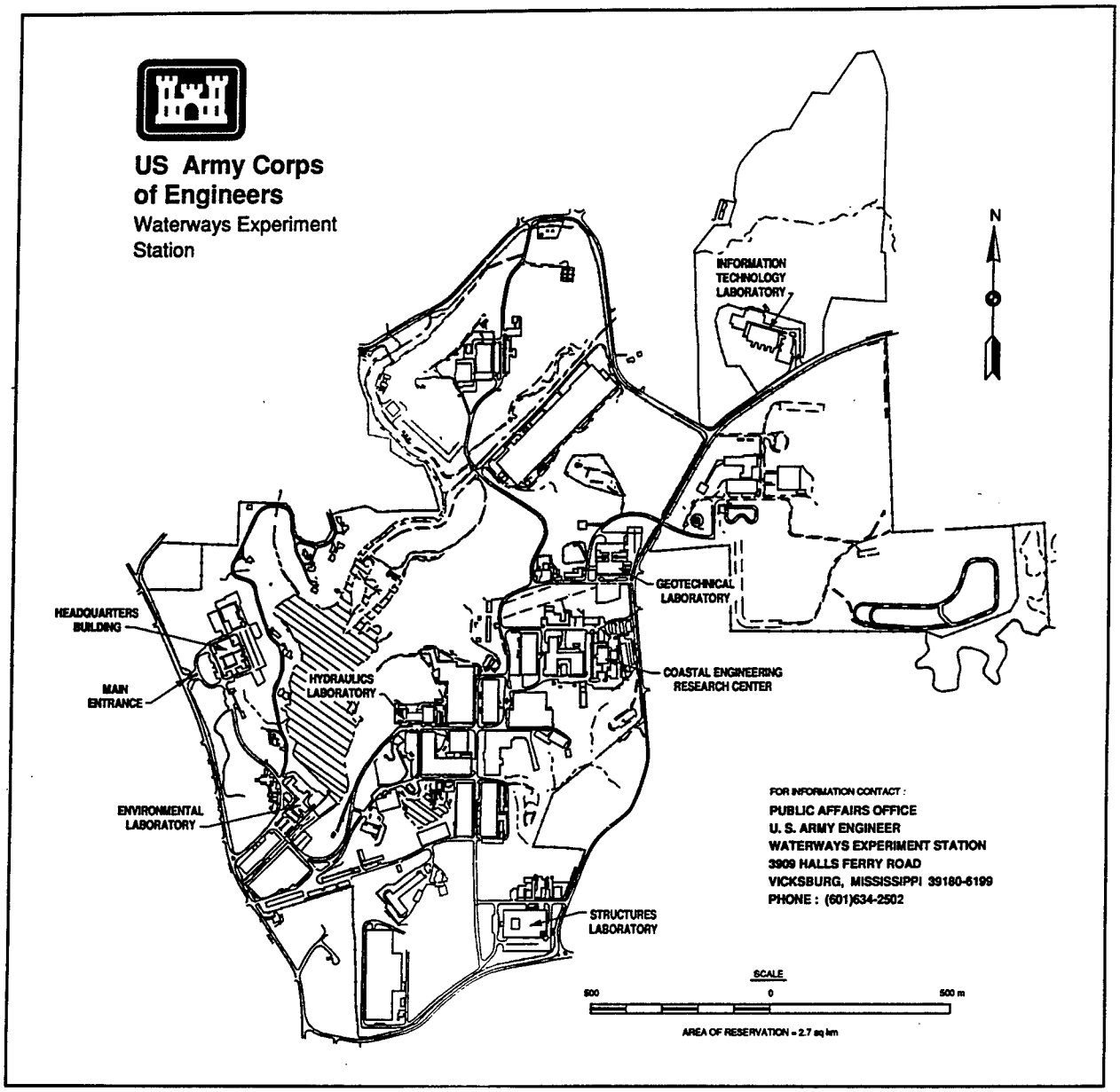

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Contents

Preface v

Executive Summary vii

1—Introduction 1

Background 1
Objective and Scope 1

2—Pavement Load-Carrying Capacity 3

General 3
Load-Carrying Capacity 4

3—Recommendations for Maintenance, Repair, and Structural Improvement 7

General 7
Recommendations 8

4—Conclusion 18

General 18
Structural Capacity and Condition Ratings 19

References 21

Appendix A: Background Data A1

Description of the Airfield A1
Previous Reports A1
Design and Construction History A3
Traffic History A4

Appendix B: Tests and Results B1

Test Conducted B1
Nondestructive Tests B1
NDT Analysis B2
Dynamic Cone Penetrometer Tests B3

Appendix C: Pavement Condition Survey and Results C1

Pavement Condition Survey C1
Analysis of PCI Data C2

Appendix D: Structural Analysis D1
General D1
ACN-PCN Method of Reporting Pavement Condition D2
PCN Analysis D3
Example Problem D4
Solution D5
Appendix E: Micro PAVER Output Summary E1
SF 298

Preface

This report provides an assessment of load-carrying capacity and the current condition of airfield pavements at Robert Gray Army Airfield, Fort Hood, Texas. This report provides data for the following functional activities:

a. Planning and programming pavement maintenance, repairs, and structural improvements.

b. Designing maintenance, repair, and construction projects.

c. Determining airfield operational capabilities.

d. Assembling information for aviation flight publications and mission planning.

Users of information from this report include the installation Director of Public Works (DPW), engineering design agencies (DPW's, U.S. Army Corps of Engineers), installation Airfield Commander, U.S. Army Aeronautical Services Agency, and agencies assigned operations planning responsibilities. Information concerning aircraft inventory, passes, and operations shall not be released outside U.S. Government agencies. This report satisfies the requirements for condition inspection and structural evaluation established in Army Regulation AR 420-72 (Headquarters, Department of the Army 1991a) and supports airfield survey requirements identified in Army Regulation AR 95-2 (Headquarters, Department of the Army 1988).

The Army Airfield Pavement Evaluation Program is managed by the U.S. Army Center for Public Works (CECPW-ER) and is technically monitored by the U.S. Army Corps of Engineers Transportation Systems Center (CEMRO-ED-TX) located in Omaha, NE. Funding for this airfield evaluation was provided by the Center for Public Works (CECPW-ER), Fort Belvoir, VA.

This publication was prepared by the U.S. Army Engineer Waterways Experiment Station (WES) based upon pavement structural testing and condition survey work at Robert Gray Army Airfield, Fort Hood, Texas, on 2 through 6 November 1995. The survey team consisted of Messrs. Richard E. Bradley, Louis W. Mason, Patrick S. McCaffrey, Jr., and Jeb S. Tingle,

Airfields and Pavements Division (APD), Geotechnical Laboratory (GL). The report was prepared by Mr. McCaffrey under the supervision of Dr. Albert J. Bush, III Chief, Technology Applications Branch, APD, Mr. Timothy W. Vollor, Acting Chief, PSD, and Dr. William F. Marcuson III, Director, GL, WES.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

Recommended changes for improving this publication in content and/or format should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to Center for Public Works, ATTN: CECPW-ER, 7701 Telegraph Road, Alexandria, VA 22310-3860.

Executive Summary

The field testing at Robert Gray Army Airfield, Fort Hood, Texas, was conducted in November 1995 by personnel of the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, MS. The structural capacity and physical properties of the pavement were determined from nondestructive tests using a heavy weight deflectometer (HWD), measurements taken in previous studies at selected locations on the airfield, and from dynamic cone penetrometer (DCP) tests. A surface inspection of the airfield was also conducted to establish the condition of the airfield surface which does not necessarily correspond to its load-carrying capacity.

The results of the tests and visual inspection reveal the following:

a. The primary pavement fixed-wing facilities and their assigned PCN are: Runway 15-33, 56/R/C/W/T; Parallel Taxiway, 64/F/A/W/T; South Ramp, 34/F/A/W/T; and North Ramp, 59/R/B/W/T. The rotary-wing airfield pavement facilities and their assigned PCN are: Taxiway 1 East, 21/F/B/W/T; Taxiway 2 East, 57/F/A/W/T; East Parallel Taxiway, 13/F/A/W/T; East Ramp Taxiway, 14/F/B/W/T; East Ramp Hoverlane, 11/F/C/W/T; and East Ramp, 8/R/C/W/T.

b. The airfield is structurally adequate to support the day-to-day mission requirements (i.e., current peacetime use) for 20 years except for features R7A, T8B, A5B, and A6B.

c. The heliport pavements used by rotary-wing aircraft are structurally adequate to support day-to-day mission requirements (i.e., peacetime use) for 20 years.

d. The surface condition of the pavement indicates that maintenance and repair (M&R) will be required for various sections of the airfield. The M&R suggested in Chapter 3 should be planned now and accomplished within the next 2 years in order to prevent further deterioration. Due to the very-poor to poor condition of features R1A, R2C, R4C, R5C, R6C, A2B, A5B and A6B reconstruction should be considered.

e. In planning structural improvements and/or reconstruction requirements, it should be noted that TM 5-825-1/AFM 32-8008 Vol. 1

(Headquarters, Departments of the Army and the Air Force 1994) specifies that Portland Cement Concrete (PCC) or composite pavements with a rigid overlay be used in numerous airfield pavements, such as ends of runways, primary taxiways, and primary parking aprons.

f. Overloading the pavement facilities may shorten the life expectancy.

Additional details on structural capacity, surface condition, and work required to maintain and strengthen the airfield are contained in Chapters 2 and 3 of this report.

1 Introduction

Background

In May 1982 the Department of the Army initiated a program to determine and evaluate the physical properties, the load-carrying capacity for various aircraft, and the general condition of the pavements at major U.S. Army airfields. The U.S. Army Center for Public Works (CECPW-ER) sponsors a program for periodic evaluation of Army Airfield facilities in accordance with Army Regulation AR 420-72 (Headquarters, Department of the Army 1991a). The evaluation of the airfield pavements was performed to determine the structural adequacy of the existing pavements to accommodate mission aircraft and to identify maintenance, repair, and construction work requirements.

Objective and Scope

The primary objectives of this investigation were to determine the allowable aircraft loads and develop a critical aircraft, and to identify maintenance, repair and structural improvement needs for each airfield pavement feature. These objectives were accomplished by:

a. Obtaining records of day-to-day traffic operations from the installation Airfield Commander.

b. Structural evaluation of the airfield pavements in accordance with TM 5-826-1/AFJMAN 32-1036/DM 21.7 (Headquarters, Departments of the Army, the Air Force, and the Navy Draft) using the nondestructive testing device and selective sampling of pavement materials.

c. Performing a condition survey to determine pavement distresses (type, severity, and magnitude) in accordance with ASTM 5340-93 and using analysis features of the Micro PAVER pavement management system.

The results of this study can be used to:

a. Provide preliminary engineering data for pavement design (Appendixes A and B).

b. Assist in identifying and forecasting maintenance and repair work (Appendix C).

c. Assist in preparation of long-range work plans and programming for maintenance, repair, and construction funds (Appendix C).

d. Determine type and gross weights of aircraft that can operate on a given airfield feature without causing structural damage or shortening the life of the pavement structure (Appendix D.)

e. Determine aircraft operational constraints as a function of pavement strength and surface condition (Appendix D).

f. Determine the need for structural improvements to sustain current level of aircraft operations (Appendix D).

g. Determine the need for structural improvements to accommodate increased use of the airfield (e.g., to accommodate mobilization outloading or new aircraft missions) (Appendix D).

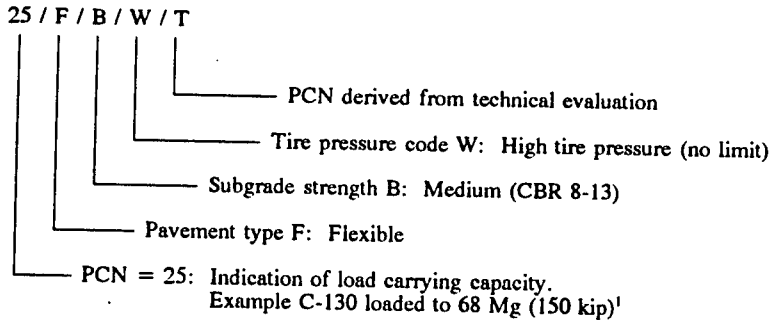
Chapter 2 of this report includes the results of the aircraft classification number - pavement classification number (ACN-PCN) analysis for use by U.S. Army Aeronautical Services Agency (USAASA), Airfield Commanders, and Deputy Chief of Staff for Operations and Plans (DCSOPS) personnel. Chapter 3 contains maintenance, repair, and structural improvement recommendations for use by Directorate of Engineering and Housing (DEH) personnel and design agencies. Chapter 4 contains conclusions and recommendations in summary form. Detailed supporting data are provided in the appendixes.

2 Pavement Load-Carrying Capacity

General

The load-carrying capacity is a function of the strength of the pavement, the weight of the aircraft loads, and the number of applications of the load. The method used to report pavement load-carrying capacity is the (ACN-PCN) system as adopted by the International Civil Aviation Organization (ICAO). The United States as a participating member of ICAO is required to report pavement strength in this format. The ACN-PCN format also provides the airfield evaluation information required by Army Regulation AR 95-2 (Headquarters, Department of the Army 1988).

The ACN and PCN are defined as follows: The ACN is a number which expresses the relative structural effect of an aircraft on both flexible and rigid pavements for specific standard subgrade strengths in terms of a standard single-wheel load. The PCN is a number which expresses the relative load-carrying capacity of a pavement for a given pavement life in terms of a standard single-wheel load. An example of a PCN five-part code is as follows:



The system works by comparing the ACN to the PCN. If the ACN is equal to or less than that of the PCN, the pavement is expected to perform

[1] Most of the dimensions and measurements reported were obtained in non-SI units. All such values have been converted using the conversion factors given in ASTM E 380.

satisfactorily for the analysis period which is typically 20 years. If the ACN is slightly higher than the PCN the pavements may be able to carry the load of the aircraft but the pavement's life will be shortened. If the ACN is significantly higher than the PCN, only a few applications of that aircraft load may lead to a structural failure of the pavement.

Load-Carrying Capacity

The first step in determining the load-carrying capacity of the pavements at Robert Gray Army Airfield (RGAAF), Fort Hood, Texas, was to estimate the traffic to which the airfield will be subjected over the next 20 years. Traffic records of the number of operations on the pavements and types of aircraft were obtained from Robert Gray Airfield Operations Office. The traffic mix established for this airfield is shown in Table A4. Based on this mix the critical aircraft (see Table D1) operating on the fixed-wing pavements was determined to be the B-747 aircraft at a design pass level of 4,900 on Portland Cement Concrete (PCC), and 2,600 passes on asphalt concrete (AC). The AH-64 was determined to be the critical aircraft operating on the rotary-wing pavements. The equivalent 20-year traffic for the AH-64 aircraft operating on PCC and AC pavements is 17,600 passes. Using this traffic information, results of the data analysis, and information from previous reports, the ACN values for the critical aircraft operating on the RGAAF pavements were determined. These values are designated as the operational ACN. For the fixed wing facilities, the operational ACN is 65/R/C/W/T for rigid pavements and 52/F/A/W/T for flexible pavements (See Table D5 for description of the five component ACN or PCN code). For the rotary-wing facilities, the operational ACN for rigid and flexible pavements is 6/R/C/W/T and 6/F/A/W/T, respectively. The numerical ACN values calculated for the critical aircraft operating on AC and PCC pavements on each of the four subgrade categories are presented in Table D2.

The critical PCN value for each airfield facility is presented in the Airfield Pavement Evaluation Chart (APEC) which is presented in Figure 2-1. A summary of allowable loads and overlay requirements determined for the critical aircraft and its design pass level is shown in Table D3. This table shows that the load-carrying capacities of the primary fixed-wing features and the primary rotary-wing features are not capable of sustaining the mission traffic over the 20 year analysis period.

The number of passes of mobilization and contingency aircraft loadings that could be sustained by each facility is dependent on the ACN of the aircraft and the critical PCN of the facility. During wartime, many aircraft are allowed to carry heavier loads than during peacetime. This means that the aircraft would have a higher ACN because of the higher loading and would cause more damage per pass than in peacetime. Also under some contingency plans or during emergencies, heavier aircraft than those in the traffic table (Table A4) could be considered for using the airfield pavements. These

aircraft would generally have higher ACN values and cause more damage than those normally using the airfield. The operational life of the pavement will be reduced if it is subjected to aircraft loadings having higher ACN values than the PCN of the facility. Appendix D contains an example of a procedure to determine the impact of mobilization and contingency aircraft operations.

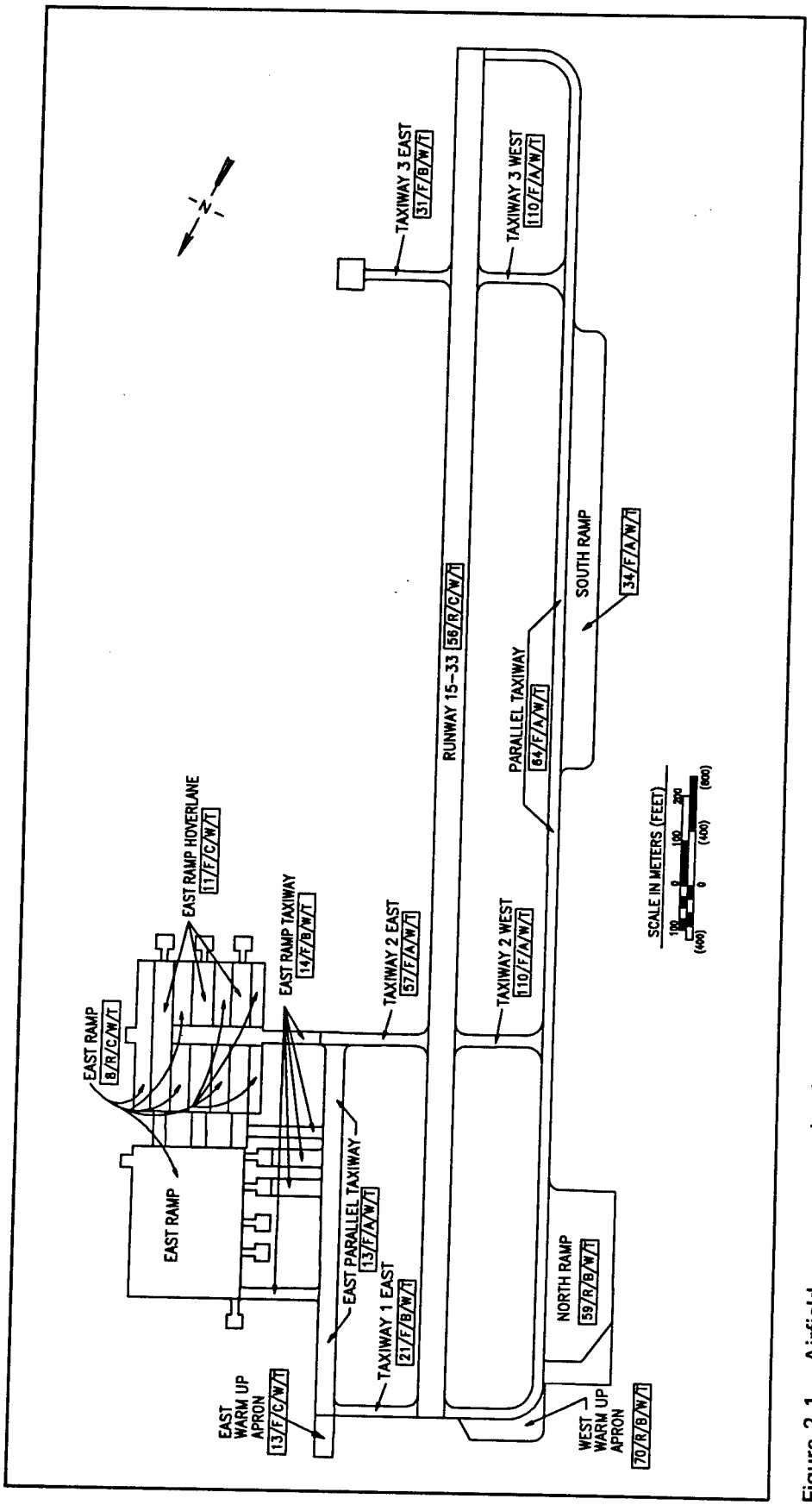


Figure 2-1. Airfield pavement evaluation chart (APEC)

3 Recommendations for Maintenance, Repair, and Structural Improvement

General

Recommendations for maintenance, repair, and structural improvements are based on results from both the structural evaluation (Appendix D) and the pavement condition survey (Appendix C). Either or both the evaluation or the survey may indicate a particular feature needs repair and/or improvement. If the pavement condition index (PCI) is below the required values contained in AR 470-72 (Headquarters, Department of the Army 1991a), the pavement needs maintenance to improve its surface condition. If the ACN/PCN determined for the critical aircraft is greater than one, the pavement needs structural improvement. Where both evaluations indicate improvements are needed, the recommendations are made such that the repairs to the surface are those needed until the structural improvements can be made. If the structural improvements are made first, the surface repairs may not be necessary. The PCI, ACN/PCN and recommended general maintenance alternatives for each feature are shown in Table 3-1. Specific recommendations are identified in Table 3-2.

Recommendations for structural improvements have been defined in terms of overlays in this report. In some instances overlays may not be the most cost effective or best engineering alternative for pavement strengthening. It should be noted that the overlay requirements shown in Table 3-2 were determined based on representative conditions at the time of testing and should be considered minimum values until verified by further investigation. These overlays should be used as a guide when programming funds for design projects. Prior to advertising an improvement project, a thorough pavement analysis and design should be completed to select the most cost effective improvement technique. All designs should be reviewed by CEMRO-ED-TX to ensure that they are in accordance with current design criteria.

Recommended overlay thicknesses follow the criteria for minimum thicknesses contained in TM 5-825-3/AFM 88-6, Chap. 3 (Headquarters, Departments of the Army and the Air Force, 1988). Where calculated thicknesses

are greater than the minimum thicknesses, the values were rounded up to the next 12.7 mm (0.5 in.).

Maintenance and repair recommendations are based on the changes needed to provide the minimum required PCI. Army Regulation AR 420-72 (Headquarters, Department of the Army 1991a) establishes those requirements at 65 to 75 for all runways and primary taxiways and 40 to 55 for aprons and secondary taxiways.

Recommendations

Steps 1 through 5 of the flowchart shown in Figure 3-1 were used in determining the recommendations suggested in Table 3-2. The maintenance and rehabilitation (M&R) alternatives suggested for the existing surfaces were selected from those listed for various distresses in rigid and flexible pavements shown in Tables 3-3 and 3-4, respectively. In many instances, the performance of a specific alternative depends upon the geographical location and expertise of local contractors. Therefore, it is suggested that the local DPW personnel review all recommendations. Local costs for the approved alternatives can then be used with the Micro PAVER program to obtain a reasonable cost estimate. All overlay, repair, or construction should be in accordance with TM 5-825-1/AFM 32-8008, Vol 1 (Headquarters, Department of the Army and the Air Force 1994) which required PCC at runway ends and for the primary taxiway and parking apron systems. The features in Table 3-2 marked with " [3] " require a PCC surface.

The PCI was developed to determine maintenance and repair needs. If the PCI is low, maintenance or repair is needed to increase the PCI. If the PCI is low and the PCN is greater than the ACN, localized maintenance or repair will generally be an acceptable solution. Although these maintenance activities and repairs will improve the PCI to acceptable levels, they may not be the most cost-effective alternative. An overlay or other overall improvement may be more cost-effective than considerable localized maintenance or repairs. Certainly, if the current PCI is less 25, overall improvements should be investigated. When an overlay is recommended, the maintenance recommended is that needed to keep the pavement serviceable until the overlay is applied. Although these recommendations will raise the PCI, the improved PCI may not remain above the minimum levels for the analysis period. The PCN and the ACN were developed to determine the capability of an airfield pavement to safely support different aircraft. If an improvement is needed to increase the PCN to the ACN and only repairs to improve the PCI are applied, the pavement will probably deteriorate quite rapidly. If the PCN is lower than the ACN, the pavement needs an improvement to increase the load carrying capacity so that the PCN will be greater than or equal to the ACN. In some cases, the PCI may be high while the PCN is lower than the ACN. In this case, the pavement needs an improvement to increase the load-carrying capacity of the pavement.

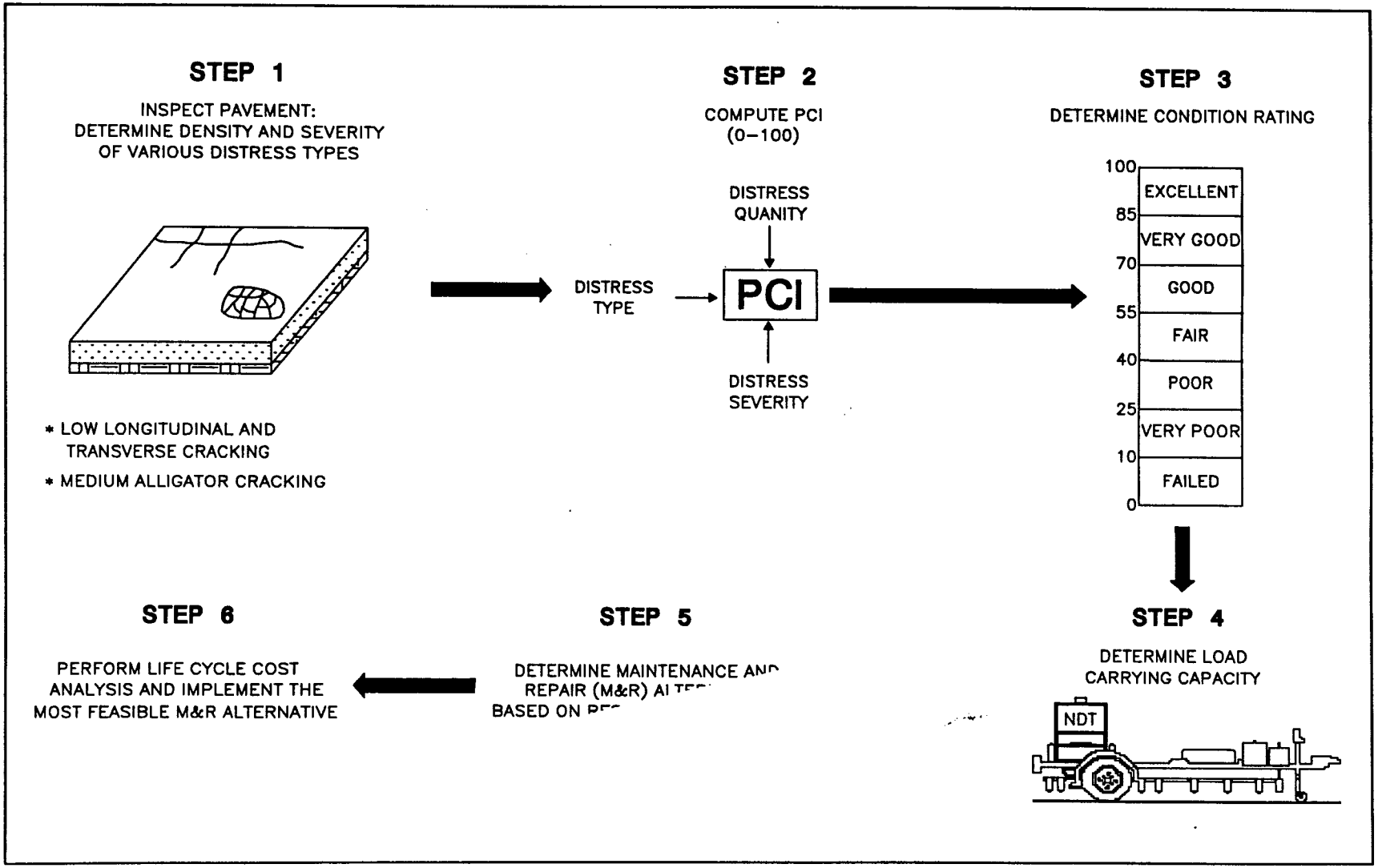


Figure 3-1. Flowchart for the determination of maintenance and repair recommendations

Table 3-1
PCI and Maintenance, Repair, and Construction Recommendations[1]

Pavement Feature	PCI	ACN/PCN[2]	Recommendations			
			Do Nothing	Maintenance	Repair	Construction
R1A	20	0.58				X
R2C	31	0.44			X	
R3C	45	0.44			X	
R4C	28	0.40			X	
R5C	26	0.62			X	
R6C	34	0.51			X	
R7A	83	1.16			X	
R8A	91	0.92		X		
T1A	58	0.44			X	
T2A	76	0.61		X		
T3A	59	0.64			X	
T4A	64	0.20			X	
T5A	44	0.81			X	
T6C	63	0.31			X	
T7C	67	0.13			X	
T8B	62	1.87			X	
T9B	63	0.29			X	
T10B	65	0.11			X	
T11B Sec 1	64	0.21			X	
T11B Sec 2	59	0.46			X	
T12B	53	0.30			X	
T13B	60	0.43			X	
T14B	56	0.43			X	
T15B Sec 1	60	0.29			X	
T15B Sec 2	56	0.46			X	
T16B	61	0.30			X	
T17B	61	0.55			X	
T18B	65	0.24			X	
T19B	62	0.24			X	

[1] Work is categorized for preliminary planning purposes only. Classification of work for administrative approval is an installation responsibility. Policy guidance for airfield pavements is provided in AR 420-72. In general, if the pavement real property facility is in a failed or failing condition, structural improvements to accommodate normal growth and evolution of missions and equipment are properly classified as repair work. The following types of work are properly classified as construction: strengthening of a pavement to accommodate a new mission, extension or widening of the pavement, or complete replacement of the real property facility. Refer to AR 420-72 for specific guidance.

(Sheet 1 of 2)

Table 3-1 (Concluded)

Pavement Feature	PCI	ACN/PCN[2]	Recommendations			
			Do Nothing	Maintenance	Repair	Construction
A2B	17	0.46				X
A3B	79	0.77		X		
A4B Sec 1	79	0.92		X		
A4B Sec 2	65	0.97			X	
A5B	25	1.53				X
A6B	30	1.02			X	
A7B	80	0.67		X		
A8B	83	0.75		X		

(Sheet 2 of 2)

Table 3-2
Summary of Overlay and Maintenance Requirements for Day-to-Day Traffic Operations

Feature	Area sq m (sq yd)	Overlay Requirements, mm (in.)[1] AC	PCC (Partial Bond)	PCC (Unbonded)	Maintenance and Repair Alternatives for Existing Surfaces
Fixed-Wing Runway 15-33					
R1A[3]	18,578 (22,222)	0 (0.0)	--	--	Surface recycling or reconstruction should be considered on this feature due to the PCI of 20. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair areas of alligator and/or slippage cracking with full depth patches.
R2C	7,430 (8,888)	0 (0.0)	--	--	Surface recycling or reconstruction should be considered for this feature due to the PCI of 31. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair areas of alligator cracking with full depth patches.
R3C	66,880 (80,000)	0 (0.0)	--	--	Surface recycling should be considered on this feature due to the PCI of 45. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair areas of alligator cracking and rutting with full depth patches.
R4C	35,298 (42,222)	0 (0.0)	--	--	Same as for R2C except the PCI is 28.
R5C	27,867 (13,333)	0 (0.0)	--	--	Same as for R2C except the PCI is 26.
R6C	11,147 (13,333)	0 (0.0)	--	--	Same as for R1A except the PCI is 34.
R7A[3]	9,289 (11,111)	102 (4.0)	102 (4.0)	178 (7.0)	Replace joint sealant with a high-quality joint sealant[2]. Clean low-severity spalls and seal with a high-quality joint sealant[2]. Repair medium- and high-severity spalls with epoxy concrete or a full depth patch. Structural improvement is required to withstand the projected traffic.
R8A[3]	9,289 (11,111)	0 (0.0)	0 (0.0)	0 (0.0)	Replace joint sealant with a high-quality joint sealant[2]. Clean low-severity spalls and seal with a high-quality joint sealant[2].

(Sheet 1 of 4)

[1] For planning purposes only.
[2] See TM 5-822-11, (Headquarters, Departments of the Army and the Air Force 1993) for guidance.
[3] TM 5-825-1/AFM 32-8008, Vol. 1 (Headquarters, Departments of the Army and the Air Force 1994) requires that the surface be PCC.

Table 3-2 (Continued)

Feature	Area sq m (sq yd)	Overlay Requirements, mm (in.)[1] AC	PCC (Partial Bond)	PCC (Unbonded)	Maintenance and Repair Alternatives for Existing Surfaces
Fixed-Wing Taxiways					
T1A[3]	6,200 (7,417)	0 (0.0)	--	--	Clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair areas of alligator cracking with full depth patches.
T2A	9,057 (10,833)	0 (0.0)	0 (0.0)	0 (0.0)	Clean cracks and low-severity spalls and seal with a high-quality joint sealant[2]. Repair medium- and high-severity spalls with epoxy concrete or full depth patch. Replace joint sealant with a high-quality joint sealant[2].
T3A[3]	43,263 (51,750)	0 (0.0)	--	--	Same as T1A
T4A[3]	4,180 (5,000)	0 (0.0)	--	--	Clean and seal low-severity cracks with asphalt emulsion or cut back asphalt.
T5A[3]	13,933 (16,667)	0 (0.0)	--	--	Surface recycling should be considered on this feature due to the PCI of 44. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair areas of alligator cracking and rutting with full depth patches.
T6C	4,528 (5,416)	0 (0.0)	--	--	Clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium-severity cracks with asphalt emulsion or cut back asphalt mixed with sand.
T7C	4,528 (5,416)	0 (0.0)	--	--	Same as T6C.
T8B	5,922 (7,083)	178 (7.0)	--	--	Clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Structural improvement is required to withstand the projected traffic.
Fixed-Wing Aprons					
A3B	9,753 (11,667)	0 (0.0)	0 (0.0)	0 (0.0)	Same as T2A.
A4B Sec 1	5,573 (66,667)	0 (0.0)	0 (0.0)	0 (0.0)	Clean cracks and low-severity spalls and seal with a high-quality joint sealant[2]. Repair medium- and high-severity spalls with epoxy concrete or full depth patch. Replace joint sealant with a high-quality joint sealant[2].

(Sheet 2 of 4)

[2] See TM 5-822-11, (Headquarters, Departments of the Army and the Air Force 1993) for guidance.
[3] TM 5-825-1/AFM 32-8008, Vol. 1 (Headquarters, Departments of the Army and the Air Force 1994) requires that the surface be PCC.

Table 3-2 (Continued)

Feature	Area sq m (sq yd)	Overlay Requirements, mm (in.)[1] AC	PCC (Partial Bond)	PCC (Unbonded)	Maintenance and Repair Alternatives for Existing Surfaces
Fixed-Wing Aprons (Continued)					
A4B Sec 2	18,578 (22,222)	0 (0.0)	0 (0.0)	0 (0.0)	Same as A4B, Sec 1.
A5B[3]	58,520 (70,000)	127 (5.0)	--	--	Reconstruction should be considered for this feature due to the PCI of 25. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Repair depressions with full depth patches. Structural improvement is required to withstand the projected traffic.
A6B[3]	26,473 (31,667)	51 (2.0)	--	--	Reconstruction should be considered for this feature due to the PCI of 30. Other alternatives are to clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand. Structural improvement is required to withstand the projected traffic.
Taxiway 1 East					
T9B	4,521 (5,408)	0 (0.0)	--	--	Clean and seal low-severity cracks with asphalt emulsion or cut back asphalt. Clean and seal medium- and high-severity cracks with asphalt emulsion or cut back asphalt mixed with sand.
Taxiway 2 East					
T10B	5,574 (6,667)	0 (0.0)	--	--	Same as for T6C.
East Parallel Taxiway					
T11B Sec 1	21,318 (25,500)	0 (0.0)	--	--	Same as for T6C.
East Ramp Taxiways and Hoverlanes					
T11B Sec 2	3,994 (4,778)	0 (0.0)	--	--	Same as for T9B.
T12B	2,787 (3,333)	0 (0.0)	--	--	Same as for T9B.
T13B	1,858 (2,222)	0 (0.0)	--	--	Same as for T9B.

(Sheet 3 of 4)

[3] TM 5-825-1/AFM 32-8008, Vol. 1 (Headquarters, Departments of the Army and the Air Force 1994) requires that the surface be PCC.

Table 3-2 (Concluded)

Feature	Area, sq ft (sq yd)	Overlay Requirements, mm (in.)[1] AC	PCC (Partial Bond)	PCC (Unbonded)	Maintenance and Repair Alternatives for Existing Surfaces
East Ramp Taxiways and Hoverlanes					
T11B Sec 2	3,994 (4,778)	0 (0.0)	--	--	Same as for T9B.
T12B	2,787 (3,333)	0 (0.0)	--	--	Same as for T9B.
T13B	1,858 (2,222)	0 (0.0)	--	--	Same as for T9B.
T14B	1,858 (2,222)	0 (0.0)	--	--	Same as for T6C.
T15B Sec 1	2,787 (3,333)	0 (0.0)	--	--	Same as for T6C.
T15B Sec 2	3,121 (3,733)	0 (0.0)	--	--	Same as for T9B.
T16B	22,498 (26,911)	0 (0.0)	--	--	Same as for T6C.
T17B	11,786 (14,098)	0 (0.0)	--	--	Same as for T6C.
T18B	11,786 (14,098)	0 (0.0)	--	--	Same as for T6C.
T19B	13,355 (15,976)	0 (0.0)	--	--	Same as for T6C.
Rotary-Wing Aprons					
A2B	4,942 (5,911)	0 (0.0)	--	--	Same as for A5B, except the PCI = 17.
A7B	83,201 (99,523)	0 (0.0)	0 (0.0)	0 (0.0)	Clean cracks and low-severity spalls and seal with a high-quality joint sealant[2]. Repair medium- and high-severity spalls with epoxy concrete or full depth patch. Replace joint sealant with a high-quality joint sealant[2].
A8B	87,641 (104,833)	0 (0.0)	0 (0.0)	0 (0.0)	Same as A7B.

(Sheet 4 of 4)

[2] See TM 5-822-11, (Headquarters, Departments of the Army and the Air Force 1993) for guidance.

Table 3-3
Maintenance, Repair, and Construction Alternatives for Airfield Pavements, Rigid

	Maintenance				Repair											Construction	
Distress Type	Seal Minor Cracks	Joint Seal	Partial Patch	Epoxy Patch	Seal Major Cracks	Full-Depth Patch	Under Sealing	Slab Grinding	Surface Milling	AC Overlay	PCC Overlay	Slab Replacement	Crack & Seat with AC Structural Overlay[3]	AC Overlay w/Geotextile	Repair/Install Surface/Subsurface Drainage System	PCC Recycling	Remove Existing PCC and Reconstruct
Blowup			L,M			M,H						H					
Corner break	L			M,H	M,H	M,H						H					
Longitudinal/transverse/ diagonal cracking	L,M				M,H					H	H	H	M,H	H	L,M,H	H	H
D cracking	L		M,H		M,H	H						H				H	H
Joint seal damage		M,H															
Patching (small) <5 ft[2]	L,M		M	L,M	M,H	M,H						H					
Patching/utility cut	L,M		M	L,M	M,H	M,H						H					H
Popouts[2]				A						A	A						
Pumping	A	A			A		A								A		
Scaling/map cracking			M,H					M,H		M,H	M,H						
Fault/settlement		L,M					M,H	L,M	M,H						L,M,H		
Shattered slab	L				L,M					M,H	M,H	M,H		H	L,M,H	H	H
Shrinkage crack[3]																	
Spalling (joints)		L	L,M	L,M,H	M,H	M,H											
Spalling (corner)			L,M	L,M	M,H	M,H											

Note: L = low severity level; M = medium severity level; H = high severity level; A = no severity levels for this distress.
[1] Drainage facilities to be repaired as needed.
[2] Popouts normally do not require maintenance.
[3] Shrinkage cracks normally do not require maintenance.

Table 3-4
Maintenance, Repair, and Construction Alternatives for Airfield Pavements, Flexible

	Maintenance				Repair											Construction		
Distress Type	Seal Minor Cracks	Repair Potholes	Partial-Depth Patching	Apply Rejuvenators[1]	Seal Major Cracks	Full-Depth Patching	Surface Treatment[2]	Slurry Seal[3]	Thin AC Overlays[4]	Surface Milling	Grooving	Porous Friction Course	Repair Drainage Facilities	Surface Recycling	AC Structural Overlay[4]	PCC Structural Overlay	Remove Existing Surface and Reconstruct	Hot Recycle	Cold Recycle
Alligator cracking	L	M,H	M			M,H	L	L					L,M,H		M,H	M,H	H		
Bleeding										L,M				M,H			H	M,H	M,H
Block cracking	L,M			L	M,H		L,M	L						M	M,H			M,H	M,H
Corrugation			L,M			L,M,H			M,H	L,M							M,H		
Depression			L,M,H			M,H			M,H				L,M,H				H		
Jet blast				A		A			A										
Reflection cracking	L,M				M,H		L,M	L							M,H			H	
Longitudinal and transverse cracking	L,M				M,H		L,M	L							M,H			H	
Oil spillage			A			A			A	A				A			A	A	
Patching	L,M		M		M	M,H									M,H		H	H	
Polished aggregate							A	A	A	A	A	A		A					
Raveling/weathering		M,H		L,M		M	L,M	L	M,H	M				M,H		H	H	M,H	
Rutting			L,M			L,M,H							L,M,H		M,H	H	H	M,H	
Shoving			L			L,M				L,M							M,H	M,H	
Slippage cracking	L		L,M		L,M	M,H									M,H		M,H	M,H	
Swell			L,M			M,H				L,M			L,M,H				H		

Note: L = low severity level; M = medium severity level; H = high severity level; A = no severity levels for this distress.
[1] Not to be used on high speed areas due to increased skid potential.
[2] Not to be used on high-type airfields due to FOD potential.
[3] Not to be used on heavy traffic areas.
[4] Patch distressed areas prior to overlay.
Drainage facilities to be repaired as needed.

4 Conclusions

Based on the results of this investigation it is concluded that:

General

The overlay requirements shown in Table 3-2 were determined based on representative conditions at the time of testing. It should be noted that the backcalculated modulus values determined for the various pavement layers can deviate throughout the year. Therefore, it is recommended that before specific improvements are programmed, a thorough pavement analysis and design be completed to select the most cost-effective improvement technique. In planning structural improvements and/or reconstruction, it should be recognized that TM 5-825-1/AFM 32-8008 Vol. 1 (Headquarters, Departments of the Army and the Air Force 1994) specifies that PCC (or composite pavement with a rigid overlay) be used at numerous locations including runway ends, primary taxiways, and aircraft parking and/or warm-up aprons.

The maintenance and rehabilitation (M&R) alternatives discussed in Chapter 3 and summarized Table 3-2 should be performed as soon as possible to retain the full benefit of the structural capacity of the existing pavement. The M&R alternatives suggested for the existing surfaces were selected from those listed for the various distresses shown in Tables 3-3 and 3-4. In many instances the performance of a specific alternative is dependent upon local condition and contractors.

The operational ACN's for the fixed-wing facilities are 52/F/A/W/T and 65/R/C/W/T for the flexible and rigid pavement features, respectively.

Structural Capacity and Condition Ratings

Runway 15-33 (Features R1A through R8A)

All features of Runway 15-33 with the exception of R7A will withstand 20 years of projected day-to-day operations. Feature R7A requires structural improvement to withstand 20 years of projected day-to-day operations. The ends of all runways are now required to be PCC as opposed to the existing AC type construction on R1A. The PCN for Runway 15-33 is 56/R/C/W/T. The general condition ratings of Runway 15-33 ranged from very poor to excellent. Due to the low condition ratings on the AC portion of the runway, surface recycling or reconstruction should be considered for features R1A, R2C, R3C, R4C, R5C and R6C.

Parallel Taxiway (Features T1A through T5A)

All features of this taxiway will withstand 20 years of projected day-to-day operations. Features T1A, T3A, T4A and T5A are AC pavement types and are now required to be PCC.

The PCN for this taxiway is 64/F/A/W/T. The general condition ratings for Features T1A through T5A are good, very good, good, good and fair, respectively. Due to the low condition ratings on Feature T5A, surface recycling should be considered.

Taxiways 3 West, 2 West, and Taxiway 3 East (Features T6C through T8B)

Features T6C and T7C will withstand 20 years of projected day-to-day operations. Feature T8B will require structural improvement to withstand 20 years of projected day-to-day operations. The PCN's for these taxiways are 169/F/A/W/T, 401/F/A/W/T and 31/F/B/W/T, respectively. The general condition ratings for these features are good.

Taxiway 1 East, Taxiway 2 East, and the East Parallel Taxiway, (Features T9B through T11B)

Taxiway 1 East, Taxiway 2 East, and the East Parallel Taxiway will withstand 20 years of projected day-to-day helicopter operations. The PCN's for these taxiways range from a low of 13/F/A/W/T on T11B section 2 to a high of 57/F/A/W/T on T10B. The general condition ratings for these features are good.

East Ramp Taxiways and East Ramp Hoverlanes (Features T12B through T19B)

The east ramp taxiways and hoverlanes will withstand 20 years of projected day-to-day helicopter operations. The PCN's for these taxiways range from a low of 11/F/C/W/T on T17B to a high of 25/F/A/W/T on T19B. The general condition ratings for these features are good.

West Warm-up Apron, North Ramp, and South Ramp (Features A3B through A6B)

The fixed-wing parking aprons will withstand 20 years of projected day-to-day operations with the exception of A5B and A6B. Features A5B and A6B require structural improvement to support 20 years of projected day-to-day operations. Features A5B and A6B are now required to be PCC type construction. PCN's are 70/R/B/W/T (A3B), 59/R/B/W/T (A4B Sec 1), 67/R/C/W/T (A4B Sec 2), 34/F/A/W/T (A5B), and 51/F/A/W/T (A6B). The general condition ratings ranged from very good to very poor on A5B.

East Warm-up Apron and East Ramp (A2B, A7B and A8B)

The rotary-wing aprons will withstand 20 years of projected day-to-day rotary-wing operations. PCN's are 13/F/C/W/T (A2B), 9/R/C/W/T (A7B), and 8/R/C/W/T (A8B). The general condition rating of A2B is very poor, and A7B and A8B are very good.

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Appendix A
Background Data

Description of the Airfield

In November 1995 the facility consisted of Runway 15-33, 61 m (200 ft) wide and 3048 m (10,000 ft) long, a parallel taxiway on the west side of the runway, cross taxiways, north and south parking aprons west of the runway, north and south parking aprons east of the runway, an alert apron with connecting taxiway to the runway, and a warm-up apron. A layout of the airfield pavements is shown in Figure A-1.

The airfield is located in an area of rolling to hilly topography. Geologically, the airfield is located in outcrops of the Fredericksburg group of Cretaceous Age. The Walnut, Comanche Peak, and Edwards formations comprise this group. The Edwards limestone outcrops and forms the cap rock of a hill (el 335 m - 1,100 ft msl) just east of the Runway. The topsoil consists chiefly of gray-to-brown calcareous sandy clay varying in thickness from a few inches to 1.5 m (5 ft). The underlying materials are generally weathered and disintegrated and consist of modular pieces of limestone with clay binder and a mixture of shell, limestone, and clay. The climate in the vicinity of RGAAF is mild with an average monthly temperature of approximately 20 degrees C (68 degrees F). The annual rainfall in the area is about 76 to 101 cm (30 to 40 in.) and is fairly evenly distributed throughout the year. The maximum and minimum temperatures were 43 and -14°C (109° and 7°F), respectively, from data recorded over a period of 36 years. The period December through February has freezing temperatures, but the duration is short causing no pavement frost-weakened periods. Temperature and precipitation data are summarized in Table A-1.

Previous Reports

Pertinent data for this airfield were extracted from a previous evaluation and condition survey reports for use in this report:

a. U.S. Army Engineer Waterways Experiment Station. (1994). "Airfield Pavement Evaluation, Robert Gray Army Airfield, Fort Hood, Texas," Miscellaneous Paper GL-94-8, Vicksburg, MS.

b. U.S. Army Engineer Waterways Experiment Station. (1988). "Condition Survey, Robert Gray Army Airfield, Fort Hood, Texas," Miscellaneous Paper GL-88-31, Vicksburg, MS.

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Design and Construction History

The pavements at RGAAF were constructed during five major construction periods with subsequent periods of reconstruction and/or structural improvements.

a. Facilities constructed during 1946 and 1947 included Runway 15-33 (current Features R1A thru R5C), the parallel taxiway (current Features T1A thru T3A), connecting taxiways (current Features T6C, T8B and T9B), the north parking apron (current Feature A4B), and the alert aprons (current Feature A2B). These pavements were designed to support operations of the B-29 aircraft (gross loading of 63503 kg (140,000 lbs).

b. The South Parking Apron (A5B) was constructed (designed to support B-29 aircraft) in 1951.

c. Construction in 1952 and 1953 included extensions to Runway 15-33 (Features R6C, R7A, and R8A), the parallel taxiway (Features T4A and T5A), and the south parking apron (Feature A6B). These pavements were designed to support a landing gear load of 38556 kg (85,000 lbs) on dual wheels spaced 950 mm (37.5 in) center-to-center, with each wheel having a contact area of 678 sq cm (267 sq in).

d. A PCC warm-up apron (Feature A3B) was constructed at the north end of the taxiway in 1956. The pavement was designed to support a landing gear load of 45360 kg (100,000 lbs) on dual wheels spaced 950 mm (37.5 in) center-to-center with each wheel having a contact area of 678 sq cm (267 sq in).

e. A 457 m (1,500 ft) section of Runway 15-33 (R5C, sta 77+00 to 90+00) was reconstructed in 1963 because of failures.

f. A 579 m (1,900 ft) section of the Runway 15-33 (R4C, sta 56+00 to 75+00) was reconstructed in 1965 because of distress.

g. Sections of the Runway 15-33 (R1A, station 6+00 to 20+00) and (R3C, sta 20+00 to 56+00) were reconstructed in 1968 and 1969 because of pavement failures. Taxiway 3 (T7C) was also reconstructed.

h. Taxiway 3 (T6C) and Runway 15-33 from sta 90+00 to 106+00 (R6C, R7A and R8A) were reconstructed in 1970.

i. The North Ramp (A4B) and a section of the Parallel Taxiway (T2A) adjacent to it were reconstructed in 1971 and 1972.

j. A section of Runway 15-33 (R4C) was reconstructed in 1981.

k. Most of the runway (R1A, R2C, R3C, R4C, R5C and R6C) was overlaid with 2.5 cm (1 in) of AC in 1983.

l. Taxiway 2 (T7C) was reconstructed in 1986. Part of the parallel taxiway was overlaid with AC (T1A and T5A with 51 mm (2 in.) and T3A and T4A with 38 mm (1.5 in.) of AC. The North Ramp (A4B, Sec 2) was enlarged with 152 mm (6 in.) of stabilized subgrade and 330 mm (13 in.) of PCC pavement.

m. New parking ramps (A7B, and A8B) and Taxiways (T10B through T19B) were constructed in 1987 and Taxiway (T9B) was overlaid with 38 mm (1.5 in.) of AC. Taxiway Features T10B and T11B were designed to support C-130 aircraft. The new parking ramps were designed to support rotary-wing traffic.

Table A2 shows the construction history of the individual pavement features which includes the pavement type, thickness, and approximate date of construction. Figure A1 presents a layout of the airfield facilities, showing the surface material types. Figure A2 presents a layout of the airfield pavements, showing the locations of the various pavement features. A summary of the physical property data for the various pavement features including pavement and foundation materials is shown in Table A3. Figures A3 through A6 shows typical pavement and foundation sections.

Traffic History

Traffic records were provided by the Robert Gray Airfield Operations Office. Both fixed- and rotary-wing aircraft are currently using the facilities. Frequencies of operation for the various aircraft are presented in Table A4 for the period 1 January 1994 to 31 October 1995. Touch-and-go operations are not considered in this evaluation.

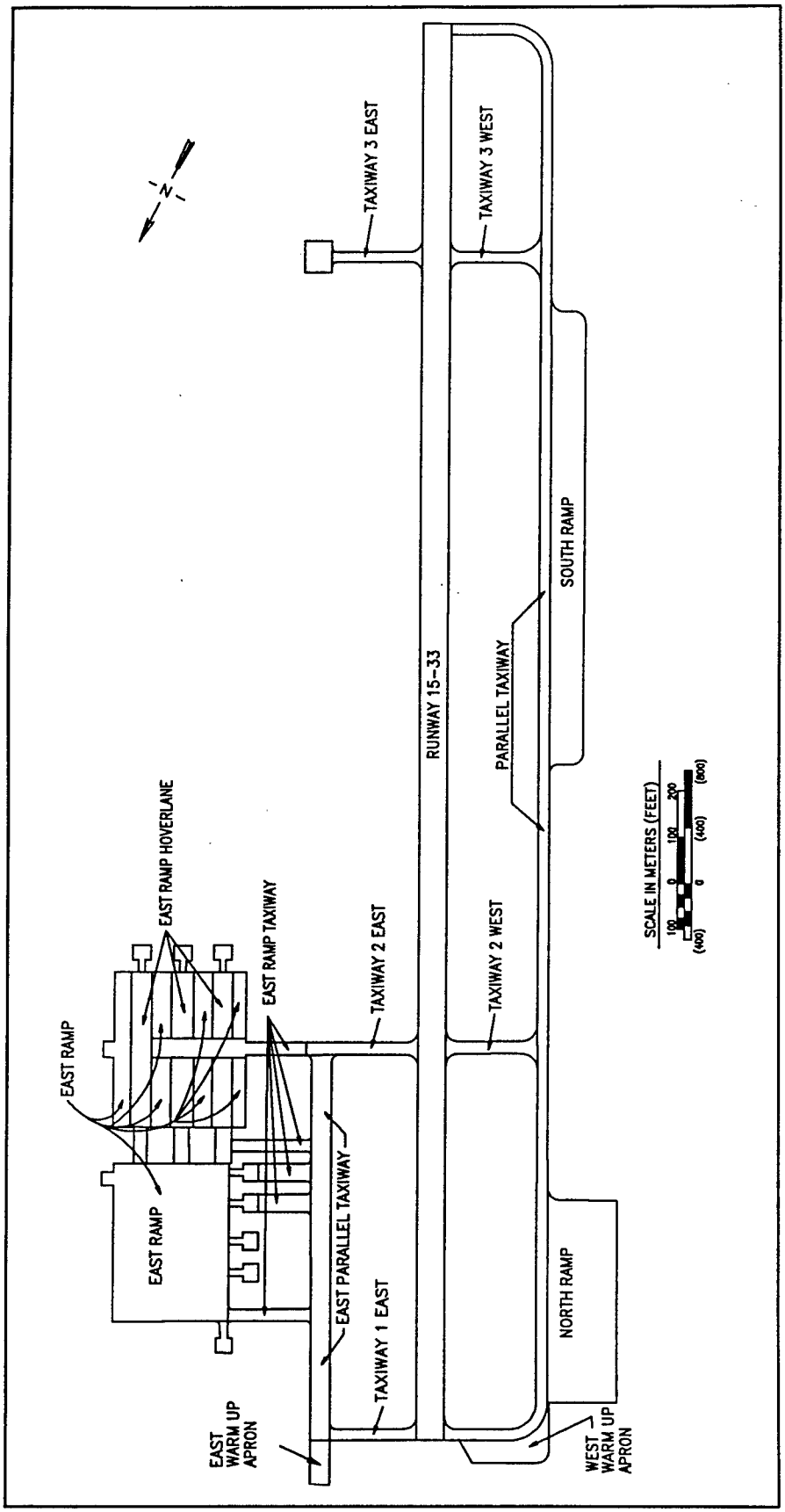

Figure A1. Layout of airfield pavements and facility identifications

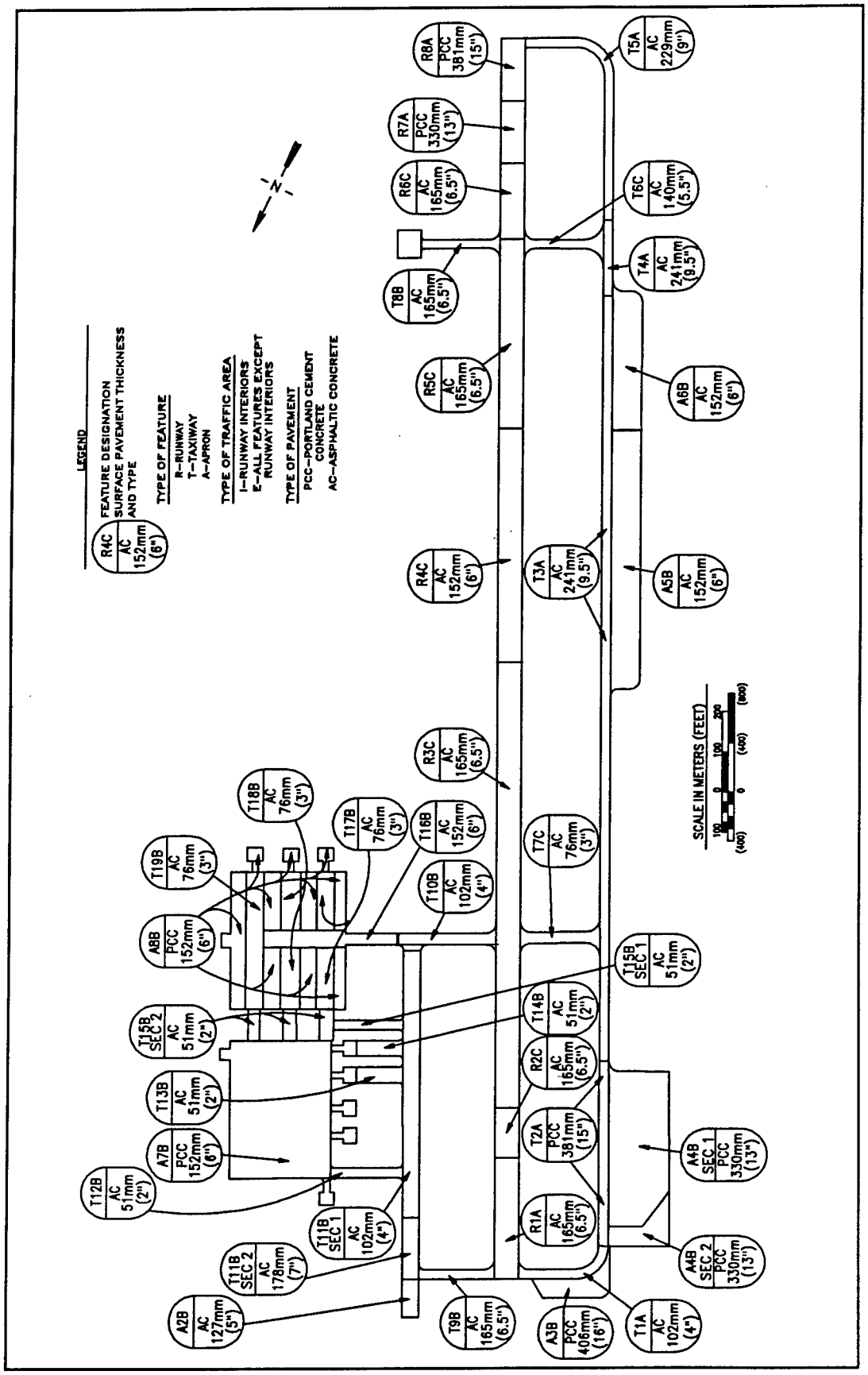

Figure A2. Pavement feature identification and location

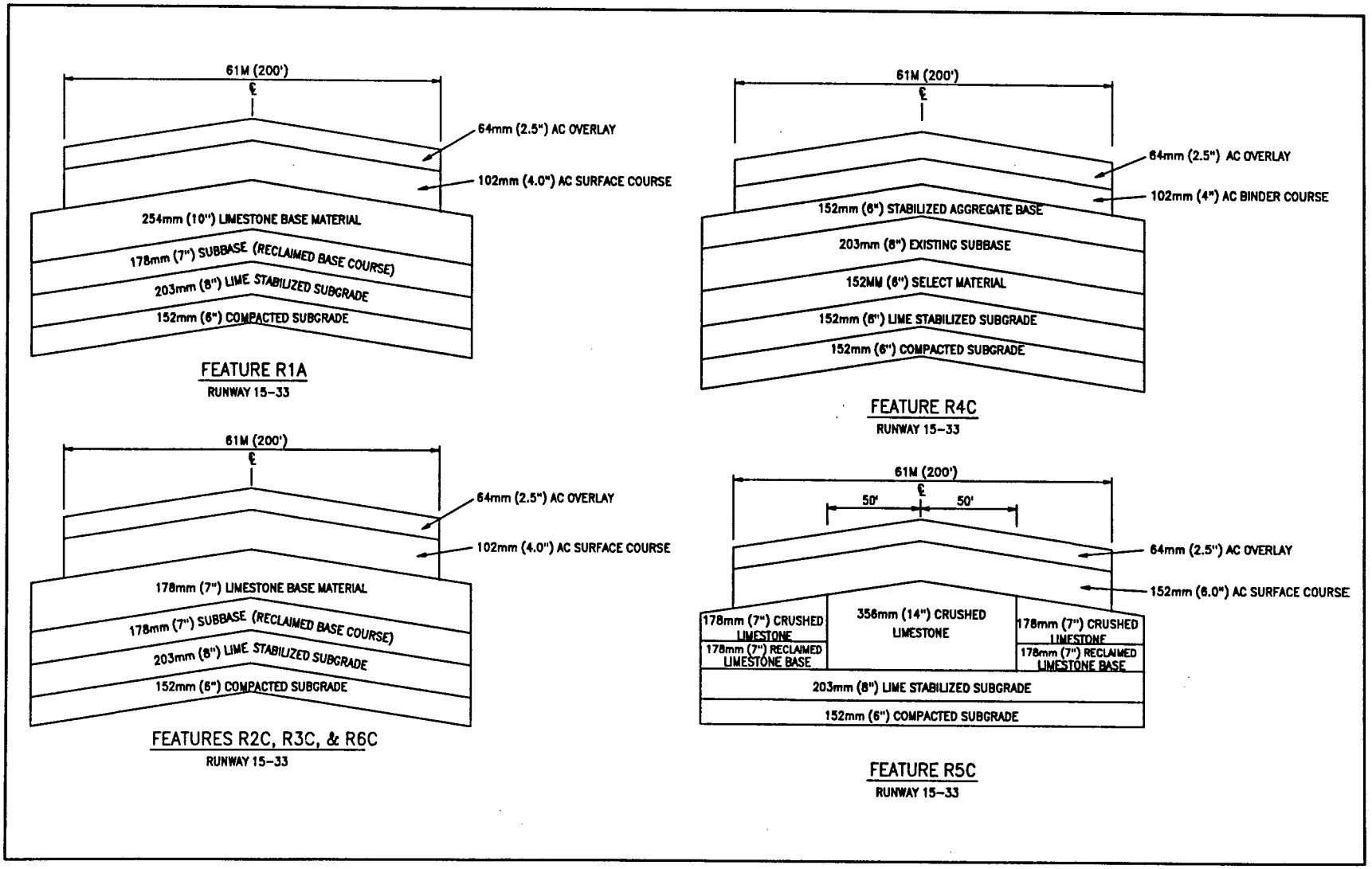

Figure A3. Typical pavement and foundation sections

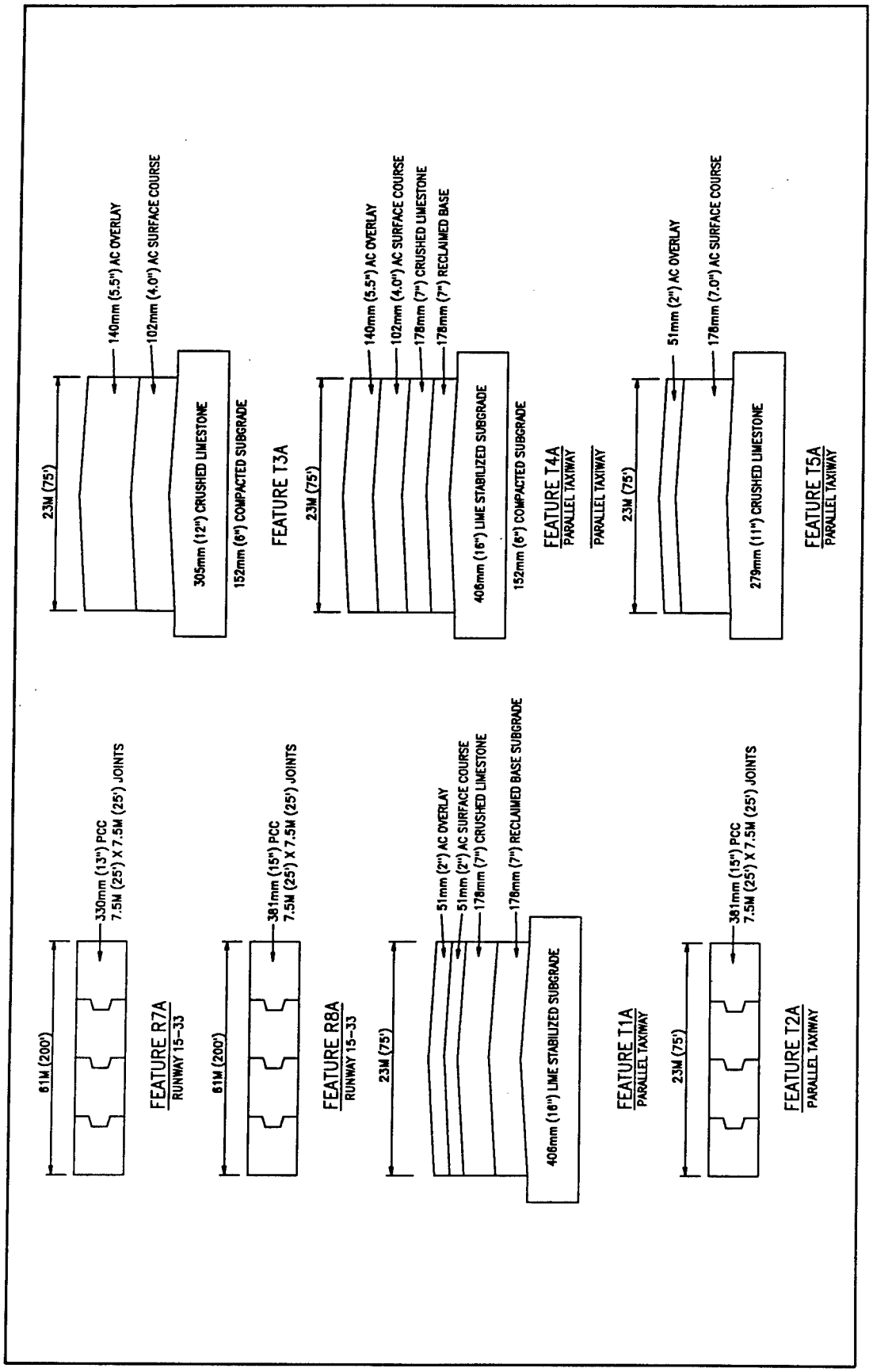

Figure A4. Typical pavement and foundation sections

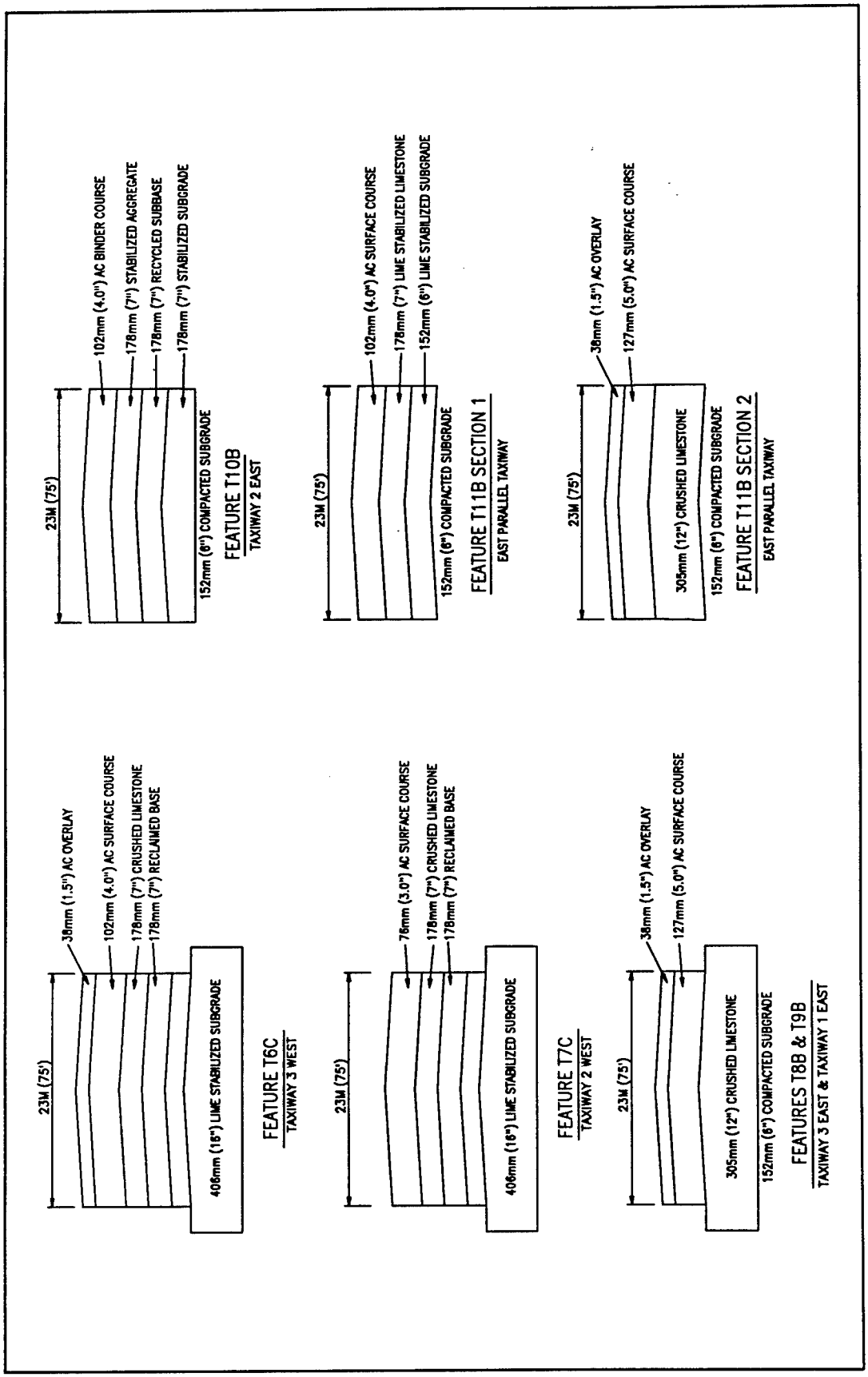

Figure A5. Typical pavement and foundation sections

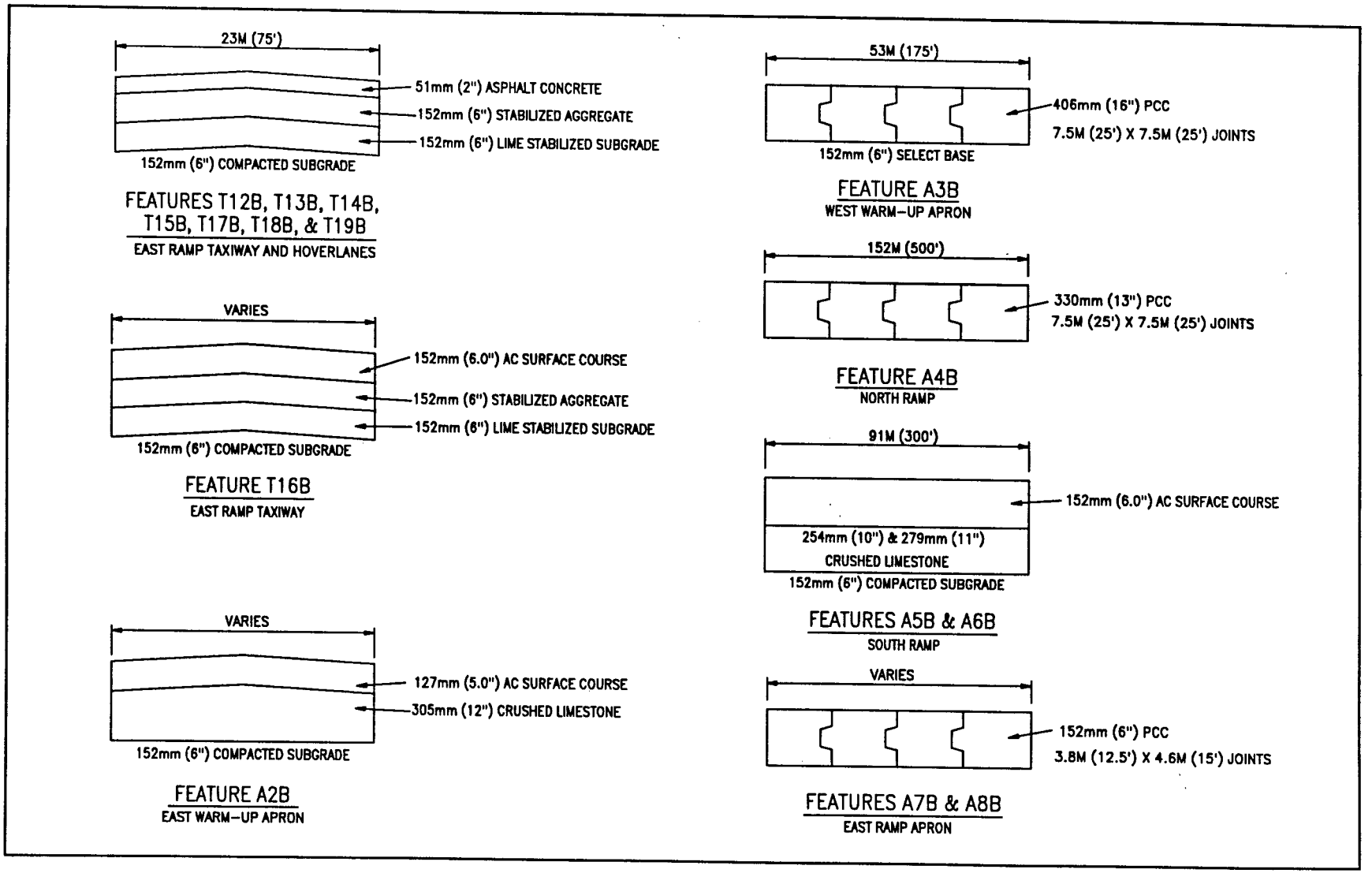

Figure A6. Typical pavement and foundation sections

Table A1
Climatological Data

	J	F	M	A	M	J	J	A	S	O	N	D	ANN	YRS REC
Temperature °C/(°F)														
Highest	30/86	34/93	38/101	37/98	38/100	42/107	43/109	42/106	41/105	39/101	33/91	32/89	43/109	36
Mean Daily Max	14/57	16/61	21/69	25/77	28/83	32/90	34/94	34/94	31/88	25/79	19/67	16/60	25/77	36
Mean Daily Min	3/37	5/41	9/48	14/57	17/64	22/71	23/73	23/73	20/68	14/58	8/47	4/40	14/57	36
Lowest	-14/7	-14/7	-9/16	0/32	6/42	11/51	16/61	16/61	6/42	0/31	-6/21	-13/9	-14/7	36
Precipitation														
Mean cm (in.)	3.6/1.4	5.8/2.3	5.1/2.0	7.8/3.1	10.9/4.3	8.1/3.2	4.3/1.7	6.4/2.5	7.6/3.0	8.6/3.4	5.6/2.2	3.8/1.6	780/30.7	36
Mean No. of Days > 1.3 cm (0.01 in.)	7	7	7	8	8	6	4	5	7	6	6	6		36
Snowfall														
Mean cm (in.)	2.5/1	2.5/1	T	T	0	0	0	0	0	0	0	0	0	36

Source of Data:
T Denotes less than 0.13 cm (0.05 in.).
* Denotes less than 0.5 day.

Table A2
Construction History

Pavement Facility (Feature)	Pavement		Completion Date
	Thickness mm (in.)	Type	
Runway 15-33			
R1A	775 (30.5)[1]	AC	1969
R2C	699 (27.5)[1]	AC	1969
R3C	699 (27.5)[1]	AC	1968-1969
R4C	648 (25.5)[1]	AC	1981
R5C	749 (29.5)[1]	AC	1963
R6C	699 (27.5)[1]	AC	1970
R7A	330 (13.0)	PCC	1970
R8A	381 (15.0)	PCC	1970
R1A, RCI, R3C, R4C, R5C, and R6C	25 (1.0)	AC	1983
Parallel Taxiway			
T1A	813 (32.0)[1]	AC	1969
T2A	381 (15.0)	PCC	1971-1972
T3A	508 (20.0)[1]	AC	--
T4A	965 (38.0)[1]	AC	1970
T5A	457 (18.0)[1]	AC	1970
T1A and T5A	51 (2.0)	AC	1986
T3A and T4A	38 (1.5)	AC	1986
Taxiway 3 West			
T6C	864 (34.0)[1]	AC	1970
T6C	38 (1.5)	AC	1986
Taxiway 2 West			
T7C	965 (38.0)[1]	AC	1969
T7C	76 (3.0)[2]	AC	1986
Taxiway 3 East			
T8B	432 (17.0)[1]	AC	1946-1947
T8B	38 (1.5)	AC	1986
Taxiway 1 East			
T9B	432 (17.0)[1]	AC	1946-1947
T9B	38 (1.5)	AC	1987
Taxiway 2 East			
T10B	584 (23.0)[1]	AC	1987
East Parallel Taxiway			
T11B Sec 1	432 (17.0)[1]	AC	1987
T11B Sec 2	432 (17.0)[1]	AC	1947
T11B Sec 2	51 (2.0)	AC	1987
East Ramp Taxiway			
T12B	356 (14.0)[1]	AC	1987
T13B	356 (14.0)[1]	AC	1987
T14B	356 (14.0)[1]	AC	1987
T15B Sec 1 and 2	356 (14.0)[1]	AC	1987
T16B	381 (15.0)[1]	AC	1987
East Ramp Hoverlane			
T17B, T18B, and T19B	203(8.0)[1]	AC	1987

(Continued)

[1] Includes AC, base and subbase.
[2] Original 4-in. AC surface pavement reconstructed with 3-in. AC in 1986.

Table A2 (Concluded)

Pavement Facility (Feature)	Pavement Thickness mm (in.)	Pavement Type	Completion Date
East Warm-up Apron			
A2B	432 (17.0)[1]	AC	1946-1947
West Warm-up Apron			
A3B	406 (16.0)[1]	PCC	1956
North Ramp			
A4B Section 1	330 (13.0)	PCC	1971-1972
A4B Section 2	330 (13.0)	PCC	1986
South Ramp			
A5B	406 (16.0)[1]	AC	1951
A6B	406 (16.0)[1]	AC	1951
East Ramp			
A7B	152 (6.0)	PCC	1987
A8B	152 (6.0)	PCC	1987

[1] Includes AC, base and subbase.

Table A3
Summary of Physical Property Data

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH M (FT)	WIDTH M (FT)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)	THICKNESS mm (IN.)	DESCRIPTION	CBR %	DESCRIPTION	CBR %[1] / K KPa/cm (PSI/IN.)
R1A	Runway 15-33	305 (1,000)	61 (200)	25 (1.0) 38 (1.5)	AC		102 (4)	AC		254 (10)	Crushed Limestone	80	178 (7) 203 (8)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10
R2C	Runway 15-33	122 (400)	61 (200)	25 (1.0) 38 (1.5)	AC		102 (4)	AC		178 (7)	Crushed Limestone	80	178 (7) 203 (8)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10
R3C	Runway 15-33	1,097 (3,600)	61 (200)	25 (1.0) 38 (1.5)	AC		102 (4)	AC		178 (7)	Crushed Limestone	80	178 (7) 203 (8)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10
R4C	Runway 15-33	579 (1,900)	61 (200)	25 (1.0) 38 (1.5)	AC		102 (4)	AC		152 (6)	Stabilized Aggregate	80	203 (8) 152 (6)	Existing Subbase Select Material	30 80	6-in. Lime Stabilized Subgrade CBR = 80 Lean Clay (CL) CBR = 10	
R5C	Runway 15-33	457 (1,500)	61 (200)	25 (1.0) 38 (1.5)	AC		152 (6)	AC		356 (14)	Crushed Limestone	80	203 (8)	Lime Stabilized Subgrade	80	Lean Clay (CL)	10
R6C	Runway 15-33	183 (600)	61 (200)	25 (1.0) 38 (1.5)	AC		102 (4)	AC		178 (7)	Crushed Limestone	80	178 (7) 203 (8)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10

[1] Values from original data.

(Sheet 1 of 5)

Table A3 (Continued)

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH M (FT)	WIDTH M (FT)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)	THICKNESS mm (IN.)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)
R7A	Runway 15-33	152 (500)	61 (200)				330 (13)	PCC								Lean Clay (CL)	
R8A	Runway 15-33	152 (500)	61 (200)				381 (15)	PCC								Lean Clay (CL)	678 (250)
T1A	Parallel Taxiway	271 (890)	23 (75)	51 (2.0)	AC		51 (2)[2]	AC		178 (7)	Crushed Limestone	80	178 (7) 406 (16)	Reclaimed Base Lime Stab. Subgrade		Lean Clay (CL)	678 (250)
T2A	Parallel Taxiway	396 (1,300)	23 (75)				381 (15)	PCC		51 (2)	Sand	678 (250)				Lean Clay (CL)	10
T3A	Parallel Taxiway	1,893 (6,210)	23 (75)	38 (1.5) 102 (4.0)	AC		102 (4)	AC		305 (12)	Crushed Limestone	80				Lean Clay (CL)	10
T4A	Parallel Taxiway	183 (600)	23 (75)	38 (1.5) 102 (4.0)	AC		102 (4)	AC		178 (7)	Crushed Limestone	80	178 (7) 406 (16)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10
T5A	Parallel Taxiway	610 (2,000)	23 (75)	51 (2.0)	AC		178 (7[3])	AC		279 (11)	Crushed Limestone					Lean Clay (CL)	10

[2] Original pavement 102 mm (4 in.) 51 mm (2 in.) milled in 1986.
[3] Original Pavement 9 in. 2-in. milled in 1986.

(Sheet 2 of 5)

Table A3 (Continued)

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH M (FT)	WIDTH M (FT)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)	THICKNESS mm (IN.)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)
T6C	Taxiway 3 West	198 (650)	23 (75)	38 (1.5)	AC		102 (4)	AC		178 (7)	Crushed Limestone	80	178 (7) 406 (16)	Reclaimed Base Lime Stab. Subgrade	30 80	Lean Clay (CL)	10
T7C	Taxiway 2 West	198 (650)	23 (75)				76 (3)[4]	AC		305 (12)	Crushed Limestone	80	178 (7) 406 (16)	Reclaimed Base Lime Stab. Subgrade	30	Lean Clay (CL)	10
T8B	Taxiway 3 East	259 (850)	23 (75)	38 (1.5)	AC		127 (5)	AC		305 (12)	Crushed Limestone	80				Lean Clay (CL)	10
T9B	Taxiway 1 East	198 (649)	23 (75)	38 (1.5)	AC		127 (5)	AC		305 (12)	Crushed Limestone	80				Lean Clay (CL)	10
T10B	Taxiway 2 East	244 (800)	23 (75)				102 (4)	AC		178 (7) 152 (6)	Stabilized Aggregate Recycled Subbase	80 81 (30)	152 (6)	Lime Stab. Subgrade	30	Lean Clay (CL)	10
T11B Sec 1	East Parallel Taxiway	700 (2,295)	30 (100)				102 (4)	AC		178 (7)	Stab. Limestone	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T11B Sec 2	East Parallel Taxiway	131 (430)	30 (100)	51 (2.0)	AC		127 (5)	AC		305 (12)	Crushed Limestone	80				Lean Clay (CL)	10

(Sheet 3 of 5)

[4] Original 4 in. Pavement replaced in 1986

Table A3 (Continued)

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH M (FT)	WIDTH M (FT)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)	THICKNESS mm (IN.)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)
T12B	East Ramp Taxiway	183 (600)	15 (50)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T13B	East Ramp Taxiway	121 (400)	15 (50)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T14B	East Ramp Taxiway	121 (400)	15 (50)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T15B Sec 1	East Ramp Taxiway	183 (600)	15 (50)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T15B Sec 2	East Ramp Taxiway	256 (840)	12 (40)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T16B	East Ramp Taxiway	527 (1,730)	43 (140)				73 (6)	AC		152 (6)	Stabilized Aggregate	80	(152) (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T17B	East Ramp Hoverlane	337 (1,106)	40 (130)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T18B	East Ramp Hoverlane	337 (1,106)	40 (130)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
T19B	East Ramp Hoverlane	337 (1,106)	40 (130)				51 (2)	AC		152 (6)	Stabilized Aggregate	80	152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10

Table A3 (Concluded)

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH M (FT)	WIDTH M (FT)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS mm (IN.)	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)	THICKNESS mm (IN.)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K KPa/cm (PSI/IN.)
A2B	Warm-up Apron	85 (280)	58 (190)				127 (5)	AC		305 (12)	Crushed Limestone	80				Lean Clay (CL)	10
A3B	Warm-up Apron	183 (600)	53 (175)				406 (16)	PCC		152 (6)	Select Base	407 (150)				Lean Clay (CL)	10
A4B Sec 1	North Ramp	366 (1,200)	152 (500)				330 (13)	PCC								Lean Clay (CL)	10
A4B Sec 2	North Ramp	Varies	152 (500)				330 (13)	PCC					152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
A5B	South Ramp sta 0+00 to 21+00	640 (2,100)	91 (300)				152 (6)	AC		254 (10)	Crushed Limestone	80				Lean Clay (CL)	10
A6B	South Ramp sta 21+00 to 30+50	290 (950)	91 (300)				152 (6)	AC		279 (11)	Crushed Limestone	80				Lean Clay (CL)	10
A7B	East Ramp	334 (1,095)	249 (818)				152 (6)	PCC					152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10
A8B	East Ramp	338 (1,110)	259 (850)				152 (6)	PCC					152 (6)	Lime Stabilized Subgrade	30	Lean Clay (CL)	10

Table A4
Aircraft Traffic Data

Aircraft	Weight kg (lb)	Number of Operations
		Total
Traffic Data for Period 1 Jan 1994 to 31 Oct 1995		
A-10	22,680 (50,000)	111
AB-300	165,149 (363,765)	3
B-737	61,236 (135,000)	57
B-727	72,576 (160,000)	35
B-747	377,849 (833,000)	145
B-757	108,864 (240,000)	6
C-5	381,022 (840,000)	233
C-141	147,419 (325,000)	119
C-130	68,100 (150,000)	185
C-9	48,988(108,000)	100
C-17	263,320 (580,000)	5
C-20	31,644 (69,700)	12
CH-47	21,338 (47,000)	63
DC-8	161,170 (355,000)	5
F-16	15,740 (34,700)	26
KC-10	267,620 (590,000)	76
L-1011	195,048 (430,000)	36
KC-135	146,059 (322,000)	21
MD-11	276,940 (610,000)	6
P-3	63,451(139,760)	3
AH-64	7,893 (17,400)	1,607
Miscellaneous	<9,072 <(20,000)	3,836

Appendix B
Tests and Results

Tests Conducted

The pavements were evaluated based on the results from the following physical tests: (a) nondestructive testing utilizing a heavy weight deflectometer (HWD) and (b) dynamic cone penetrometer (DCP) tests. The test procedures and results are discussed below.

Nondestructive Tests

Test equipment

Nondestructive tests were performed on the pavements with the Dynatest model 8081 heavy weight deflectometer (HWD). The HWD is an impact load device that applies a single-impulse transient load of approximately 25-30 millisecond duration. With this trailer-mounted device, a dynamic force is applied to the pavement surface by dropping a weight onto a set of rubber cushions which results in an impulse loading on an underlying circular plate 300 mm (11.8 in.) in diameter in contact with the pavement. The applied force and the pavement deflections are respectively measured with load cells and velocity transducers. The drop height of the weights can be varied from 0 to 399 mm (15.7 in.) to produce a force from 0 to approximately 224 kN (50,000 lb). The system is controlled with a micro computer which also records the output data. Velocities were measured and deflections computed at the center of the load plate (D1) and at distances of 305 (12), 610 (24), 914 (36), 1219 (48), 1524 (60), and 1829 mm (72 in.) (D2 - D7) from the center of the load plate in order to obtain deflection basin measurements.

Test procedure

On runways and taxiways deflection basin measurements were made at 30 m (100 ft) intervals on alternate sides of the centerline along the main gear

wheel paths. For flexible pavements, the tests were performed on a 3.0 to 3.7 m (10 to 12 ft) offset from the centerline. For rigid pavements, the tests were conducted at the center of the slab or largest unbroken piece. The parking aprons, warm-up aprons, and engine run-up area were tested in a grid pattern of approximately 30 m (100-ft) intervals or at locations that were selected to ensure that adequate NDT were performed per feature for evaluation purposes. Lines along which the NDT were conducted, or locations tested (specified by number), on each pavement facility are indicated in Figure B1. At each test location pavement deflection measurements were recorded at force levels of approximately 58 (13), 111 (25), and 156 (35) kN (kips). Impulse stiffness modulus (ISM) values were then calculated based on the slope (load/deflection) of the plot of impulse load versus the deflection at the first sensor (DO) for the maximum force level.

The ability of the joints in the PCC slabs to transfer load is measured with the FWD device. The ratio of deflections measured on each side of the joint (deflection of unloaded side /deflection of loaded side) is related to joint efficiency or load transfer. Joint test were conducted at select locations on the PCC pavements. Table B1 shows the summary of joint ratio test on PCC pavements.

NDT Analysis

The NDT test results or ISM data for each facility were grouped according to different pavement features. The ISM data within a feature were grouped according to differences in magnitude of the ISM values and are called sections. Visual inspection of the ISM data indicated that only one section per feature was needed. Figures B2 through B23 show graphically the ISM test results. A representative basin for each feature was determined using a layered elastic evaluation program (LEEP). Table B2 shows the representative basins for each feature as determined from the NDT.

Representative basins were used to determine section modulus values of the various layers within the pavement structure in each section. Deflections basins were input to a layered elastic multi-layered backcalculation program to determine the surface, base, and subgrade modulus values. The program determines a set of modulus values which provide the best fit between a measured deflection basin (NDT) and a computed (theoretical) deflection basin. Table B3 presents a summary of the backcalculated modulus values based on the representative basins for each pavement section.

Modulus values for AC pavements can be determined using three methods: (a) use the surface temperature at the time of testing and the previous five day mean air temperature, (b) backcalculate the modulus values using the FWD deflection basins, or (c) determine the design modulus from past temperature data. In an evaluation, pavements are evaluated for a design life of 20-years.

Modulus of AC is temperature dependent; therefore the seasonal variation in temperature is accounted for by using the design modulus from past temperature data. From the climatological table (Table A1), an average daily maximum temperature of 34 C (94°F) and an average daily mean of 29°C (84°F) were used in determining the design AC modulus. At a frequency level of 2 Hz for the taxiways and aprons, the design AC modulus was 444 MPA (64,346 psi) and at a frequency level of 10 Hz for the runways, the design AC modulus was 853 MPA (123,795 psi). The design AC modulus along with the backcalculated values for the base, subbase, and subgrade layers were used to determine the structural capacity of the AC pavement features.

Modulus values for PCC pavements can be backcalculated using the HWD deflection basins or a design modulus for the PCC can be used. In the evaluation of a rigid pavement, the design modulus should be used for the PCC layer along with the backcalculated modulus values for the base, subbase, and subgrade layers and the joint ratio test results. Backcalculated PCC modulus values are shown in Table B2. Value of 34474 MPA (5,000,000 psi) is recommended for a PCC layer in good condition.

Dynamic Cone Penetrometer Tests

A DCP soil test device was used to obtain subsurface soil data at representative locations. The DCP is a steel cone attached to the end of a metal rod on the other end of which is located an 8.2 kg (18-lb) sliding drop-hammer. For this investigation a small hole was cored through the AC or PCC material. The cone of the DCP was then placed on top or near the top of the base and the hammer was then dropped repeatedly to drive the cone through the underlying pavement layers. The material resistance to penetration was recorded in terms of inches penetrated per hammer blow. California Bearing Ratio (CBR) was then determined based on a correlation and procedure recommended in (Webster, Grau, and Williams 1992). DCP tests were performed at 8 locations on the runway, taxiways, and parking aprons. The results of the DCP tests are best illustrated on a plot of CBR versus depth for each test location. Figures B24 through B31 show these data for the tests performed on the facilities.

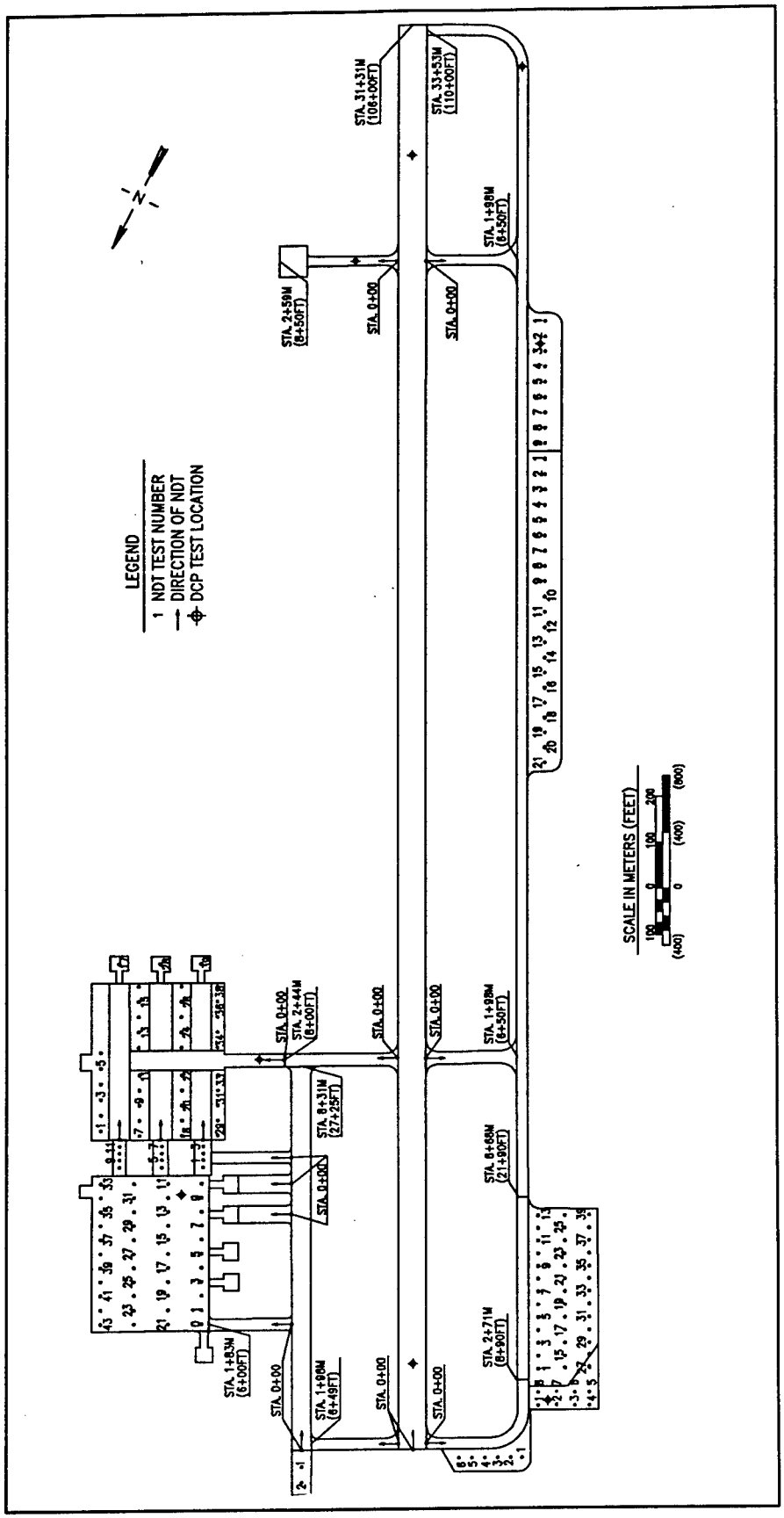

Figure B1. NDT and DCP test location and direction

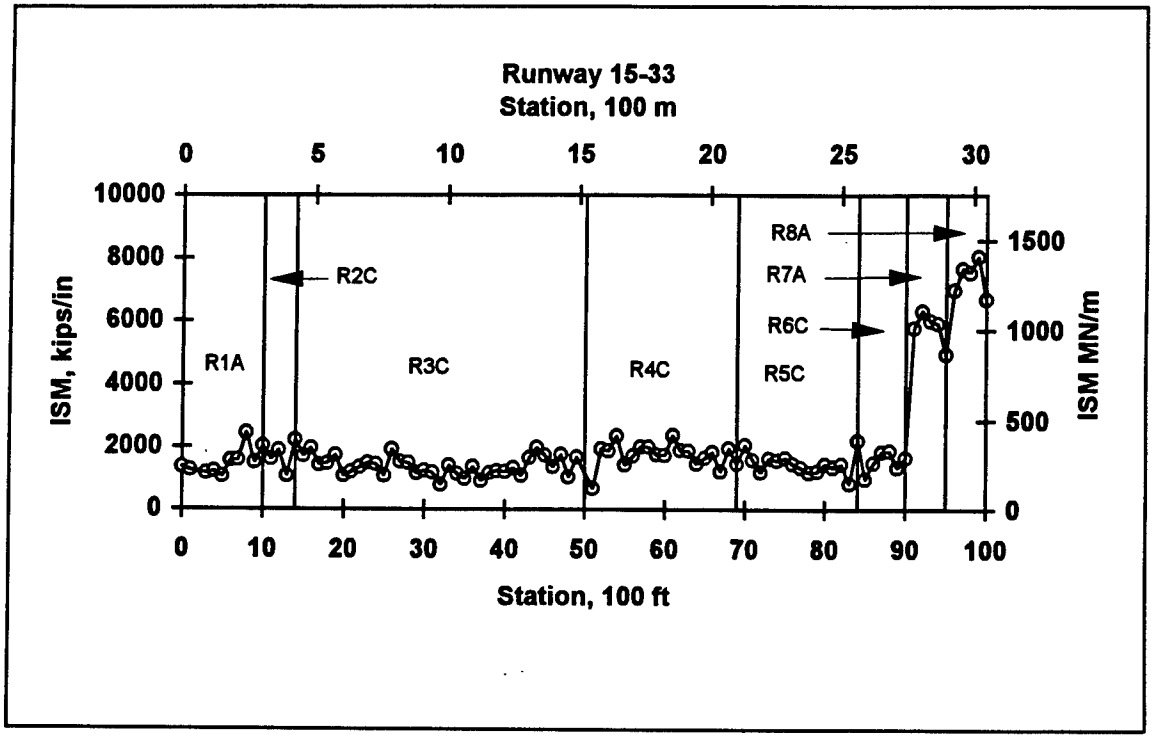

Figure B2. ISM profile, Runway 15-33,(R1A, R2C, R3C, R4C, R5C, R6C, R7A, and R8A)

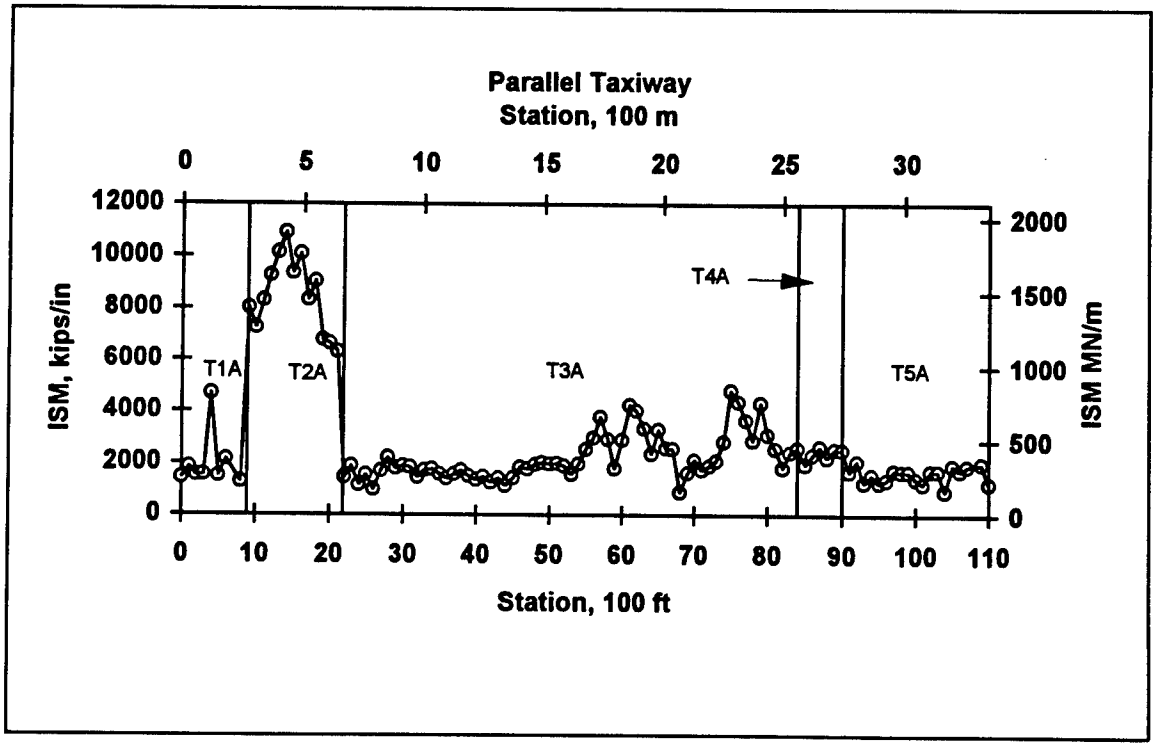

Figure B3. ISM profile, Parallel Taxiway, (T1A through T5A)

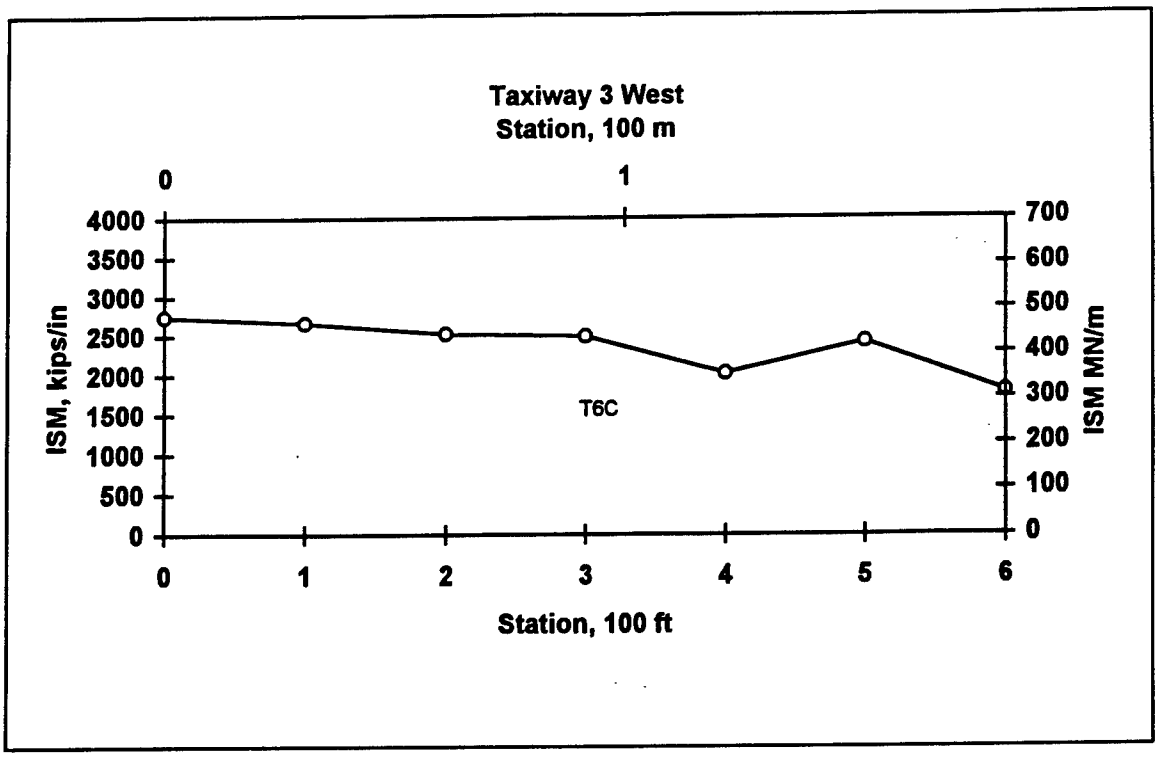

Figure B4. ISM profile, Taxiway 3 West , (T6C)

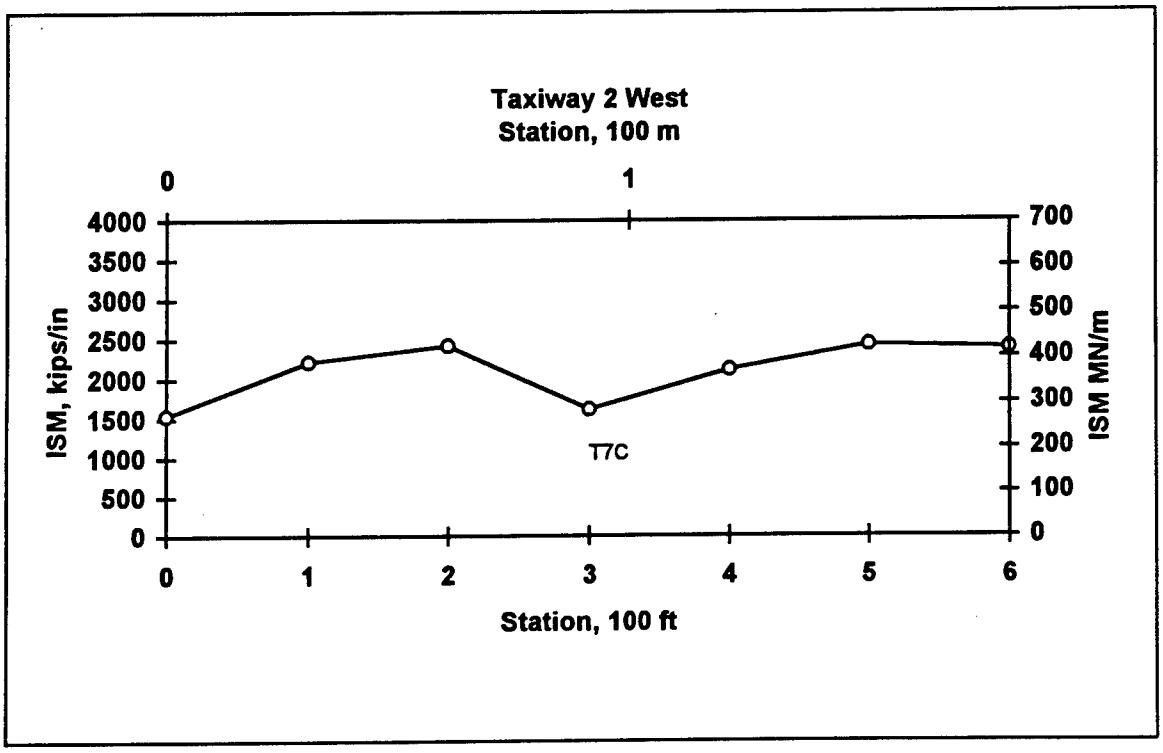

Figure B5. ISM profile, Taxiway 2 West, (T7C)

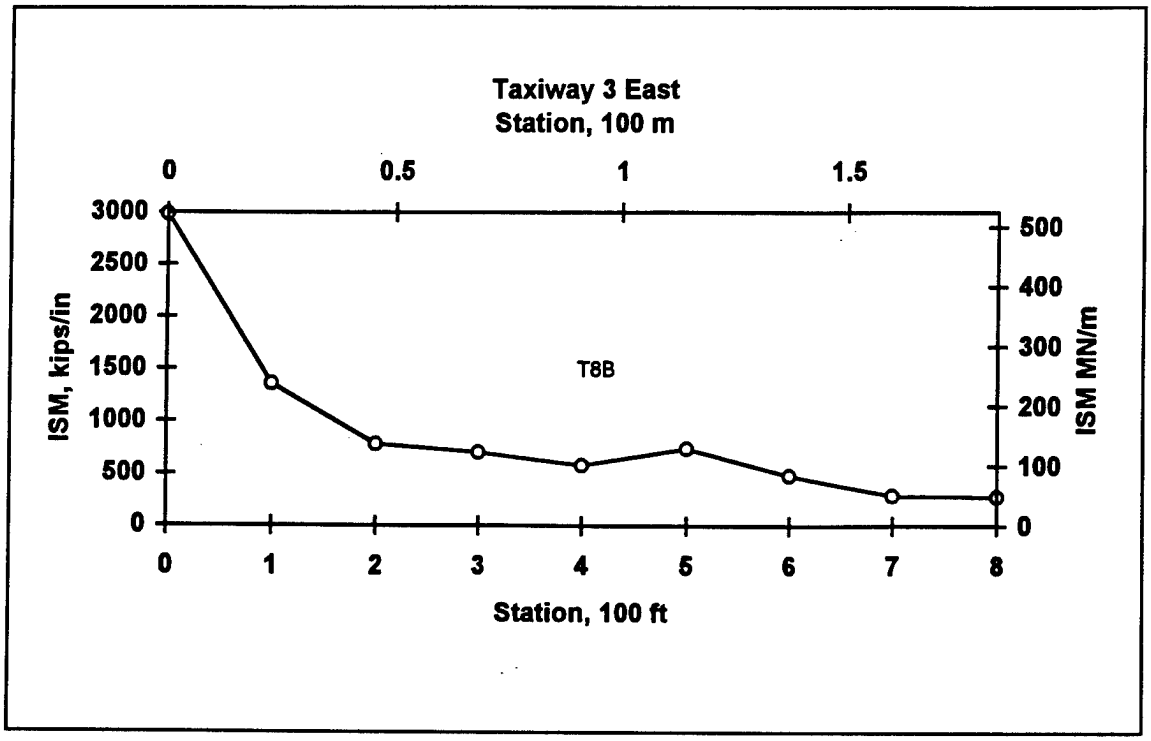

Figure B6. ISM profile, Taxiway 3 East, (T8B)

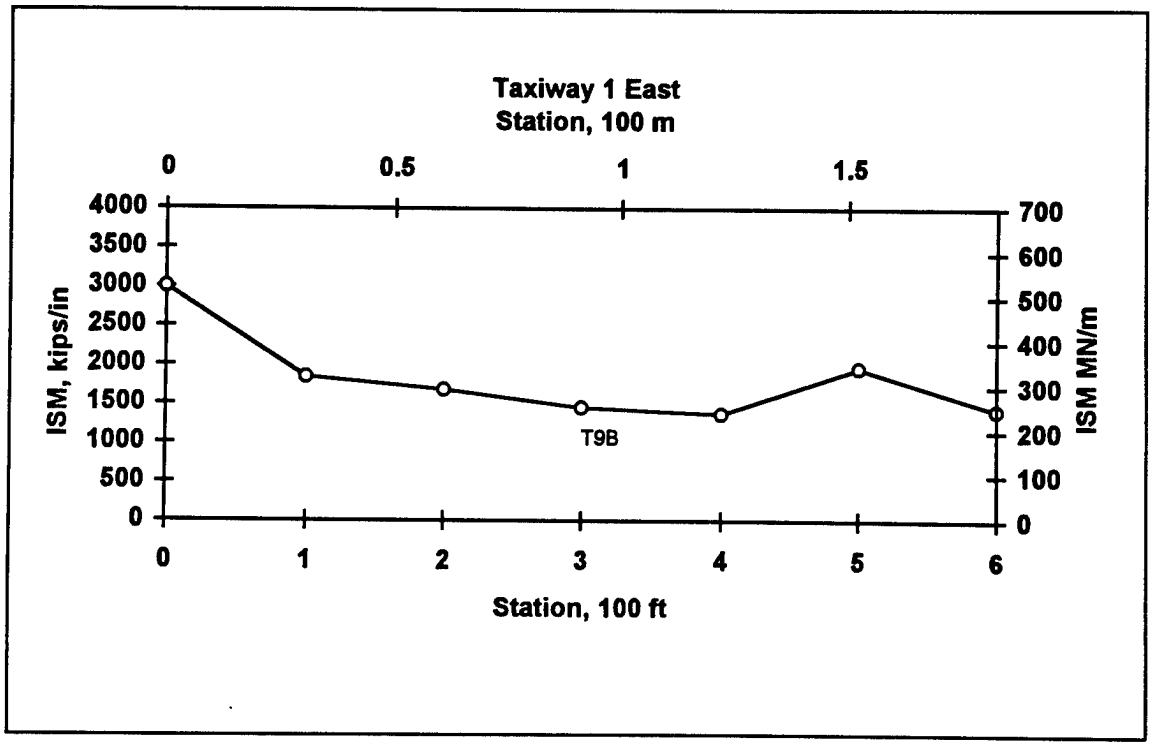

Figure B7. ISM profile, Taxiway 1 East (T9B)

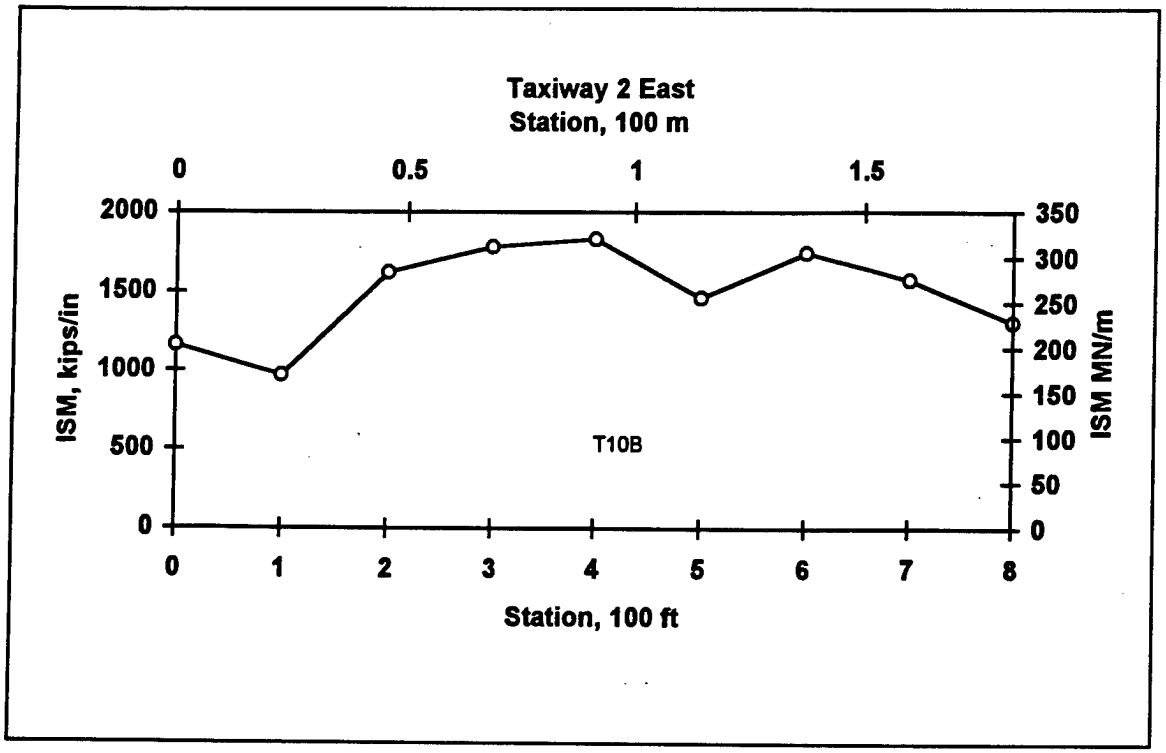

Figure B8. ISM profile, Taxiway 2 East, (T10B)

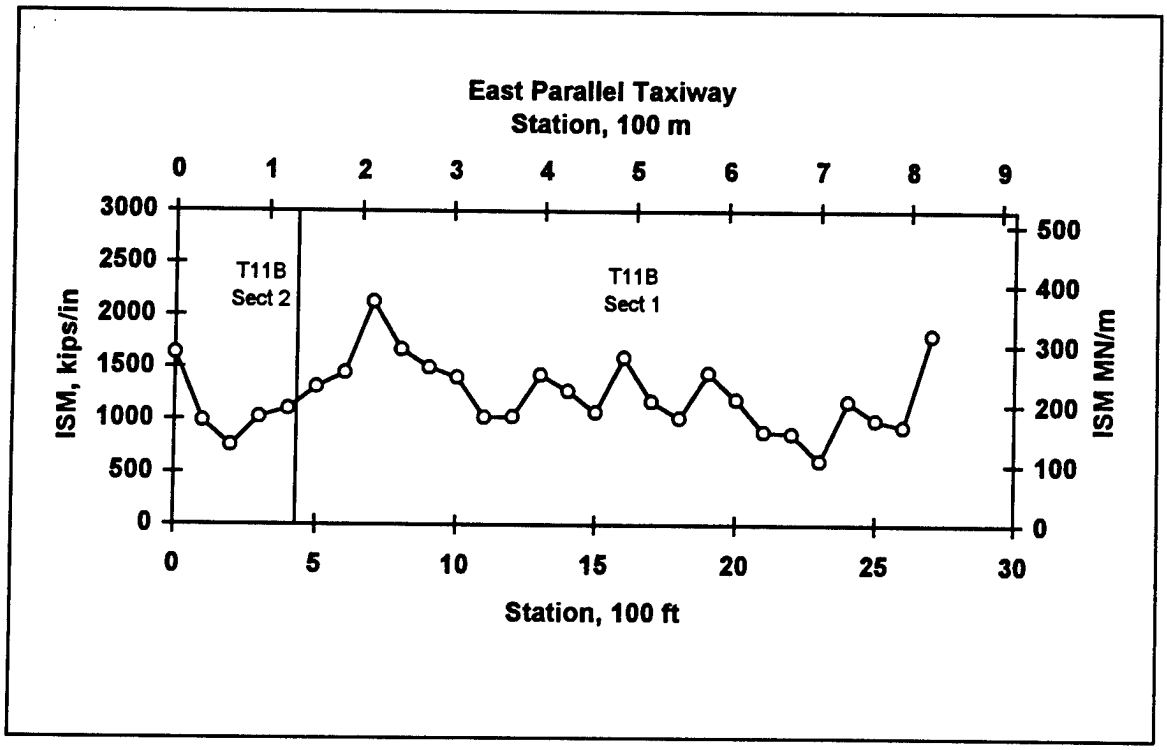

Figure B9. ISM profile, East Parallel Taxiway (T11B Sections 1 and 2)

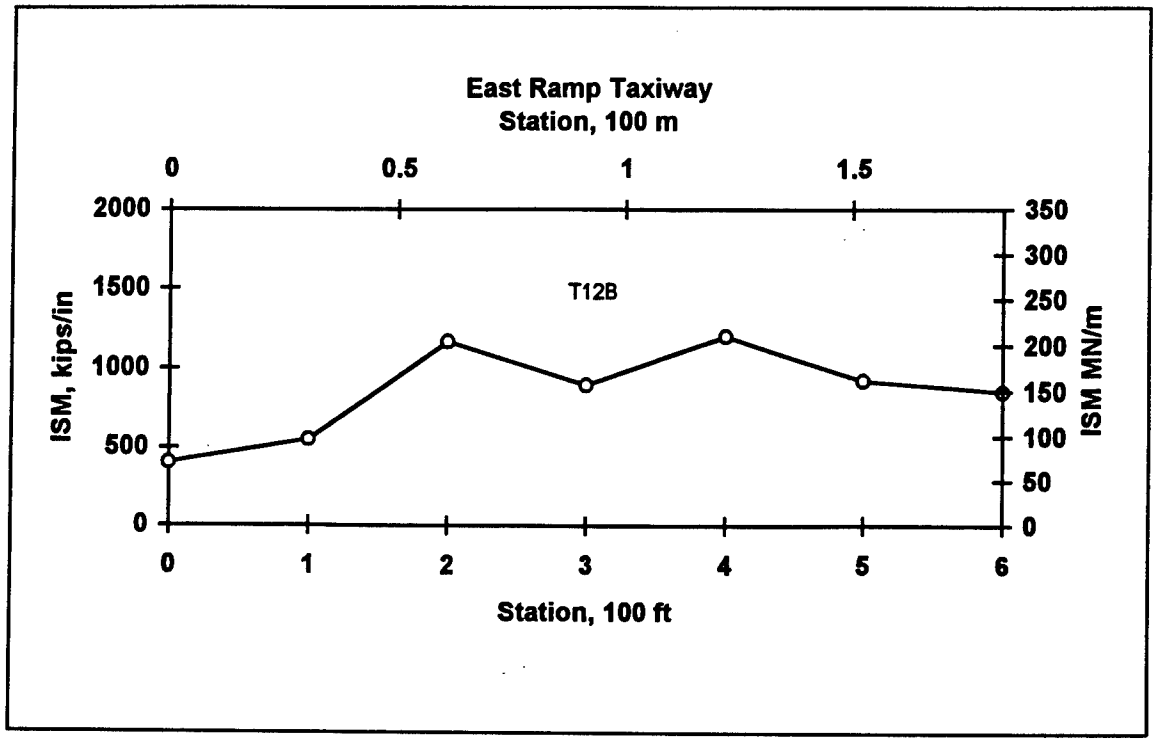

Figure B10. ISM profile, East Ramp Taxiway, (T12B)

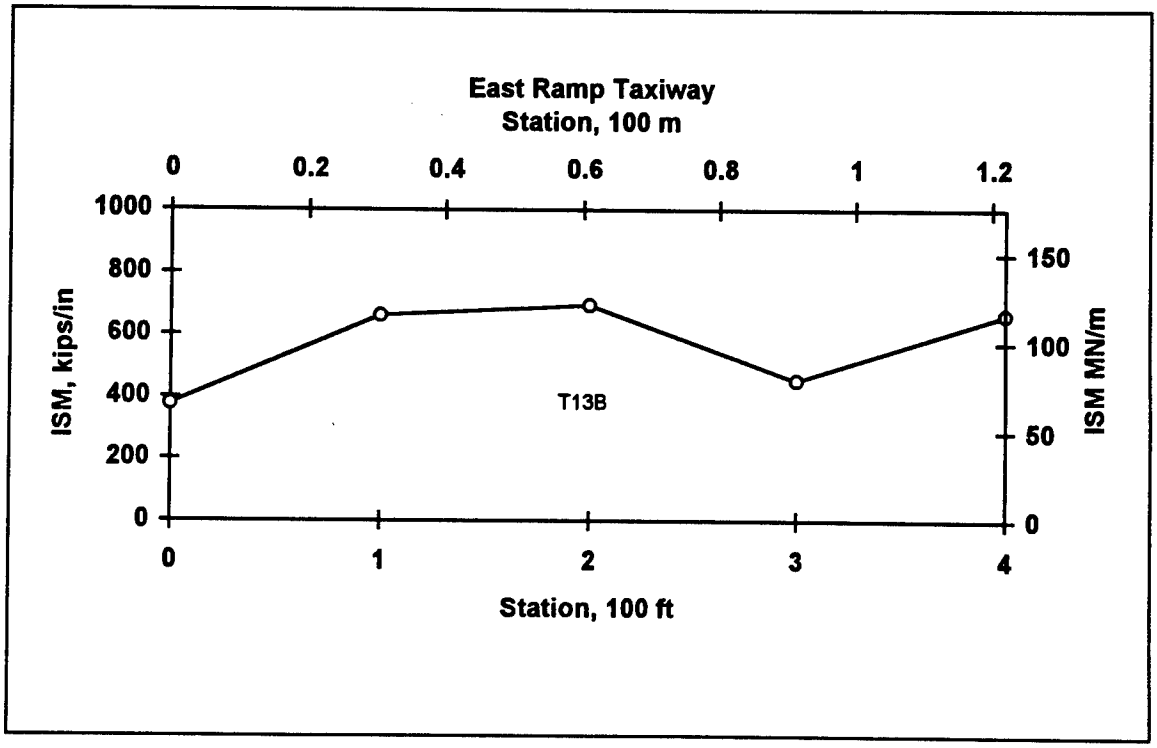

Figure B11. ISM profile, East Ramp Taxiway, (T13B)

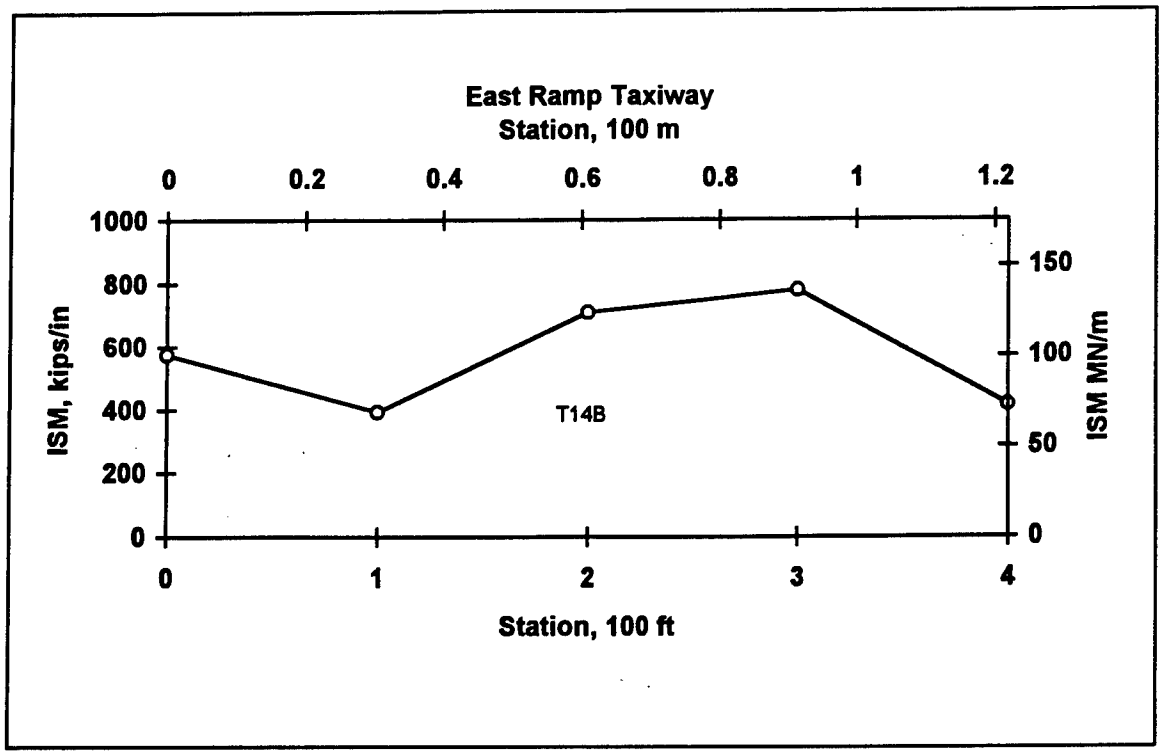

Figure B12. ISM profile, East Ramp Taxiway, (T14B)

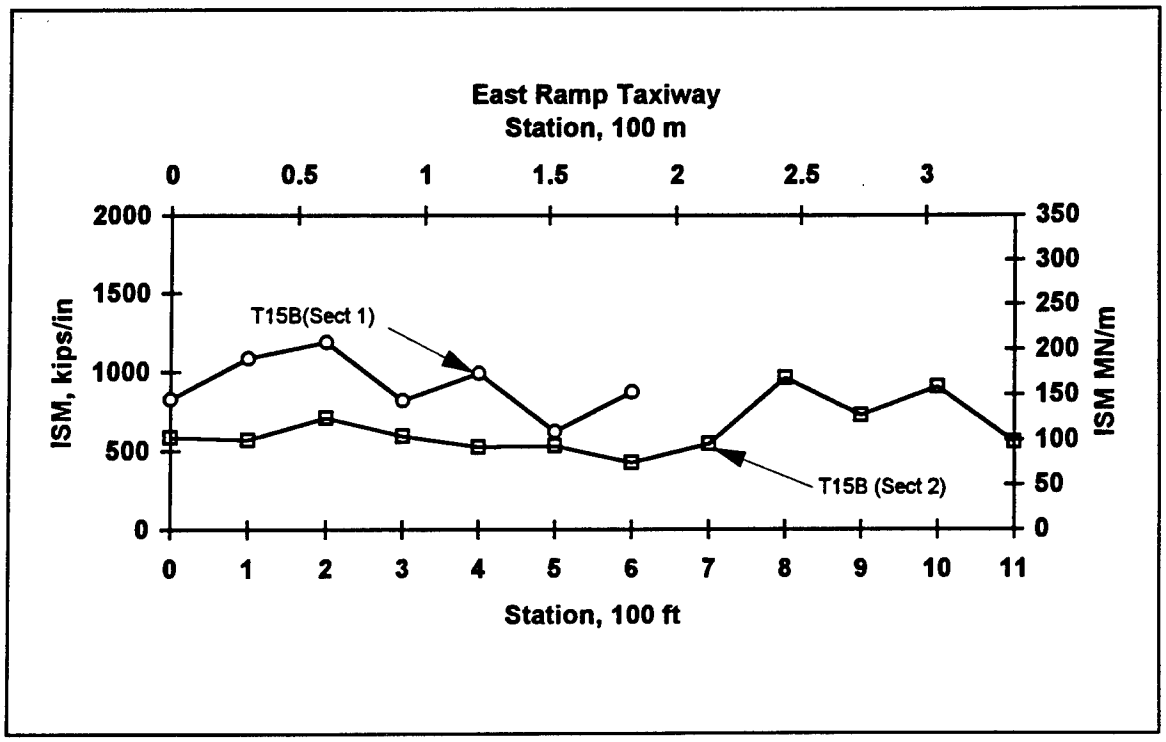

Figure B13. ISM profile, East Ramp Taxiway, (T15B Sections 1 and 2)

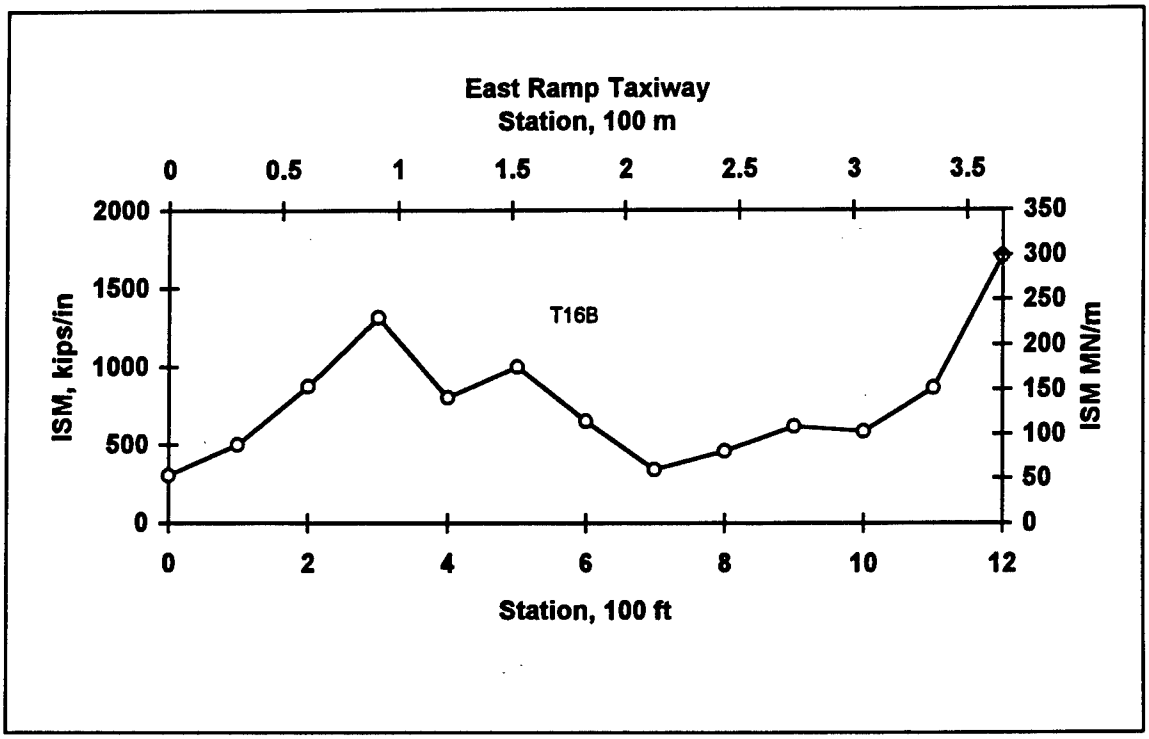

Figure B14. ISM profile, East Ramp Taxiway, (T16B)

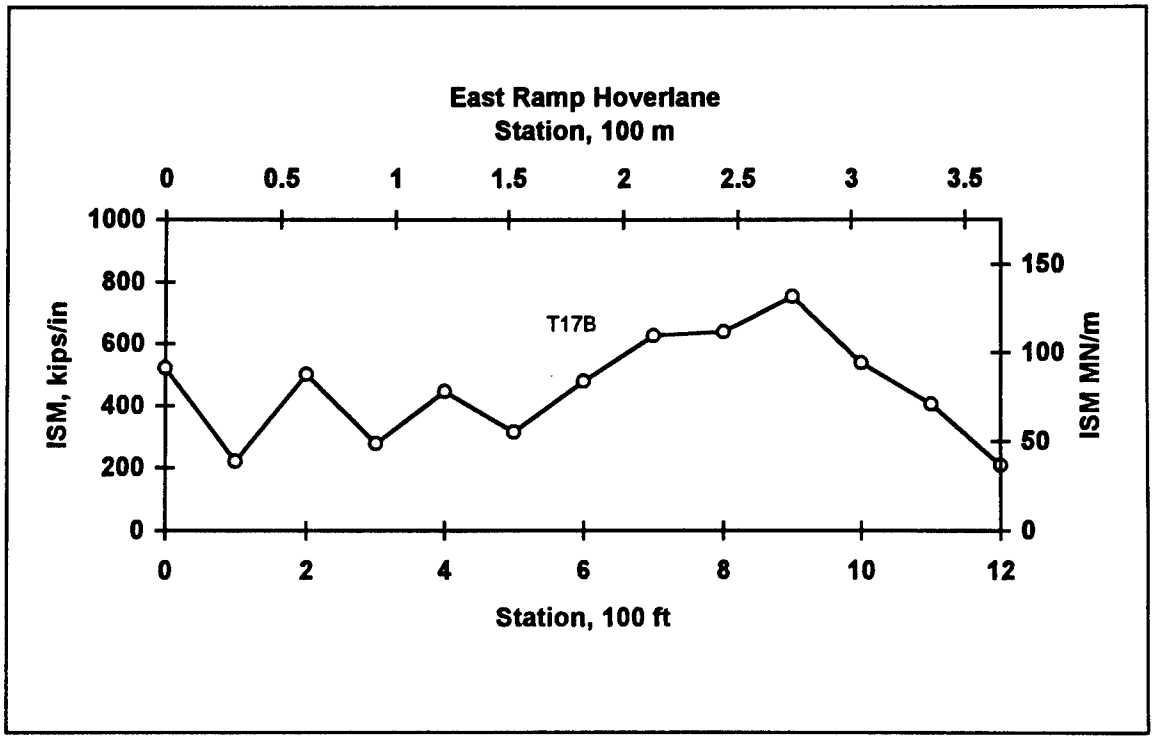

Figure B15. ISM profile, East Ramp Hoverlane, (T17B)

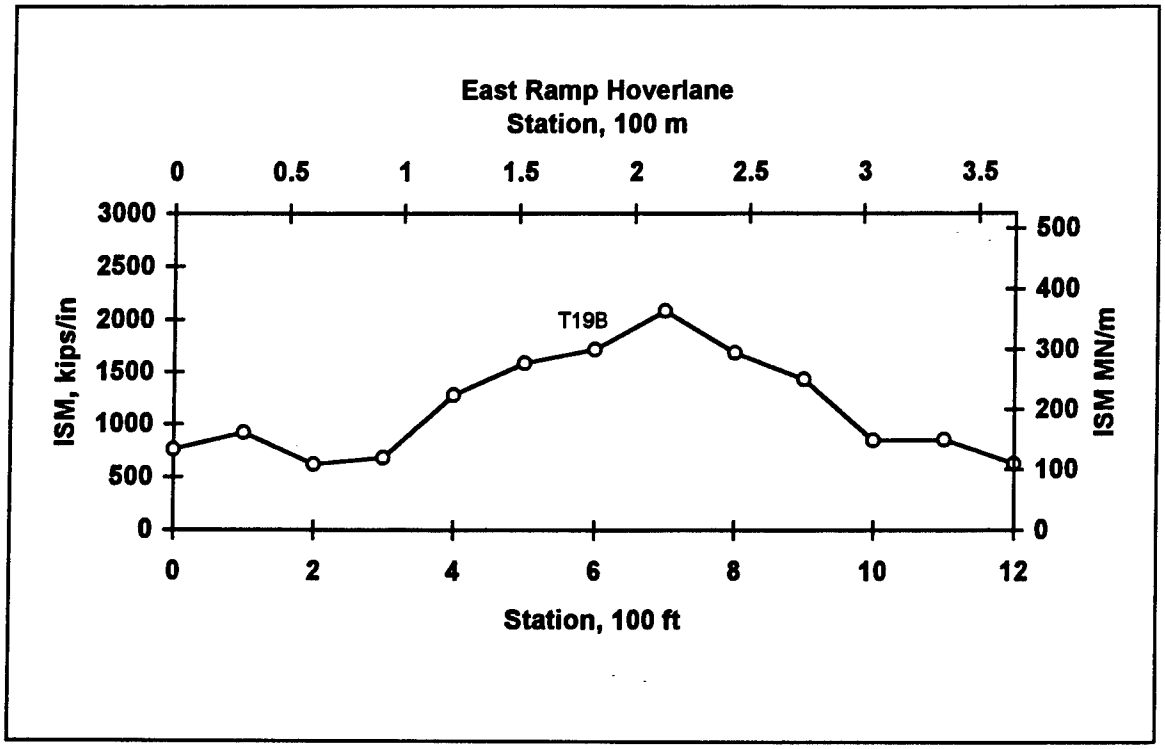

Figure B16. ISM profile, East Ramp Hoverlane, (T19B)

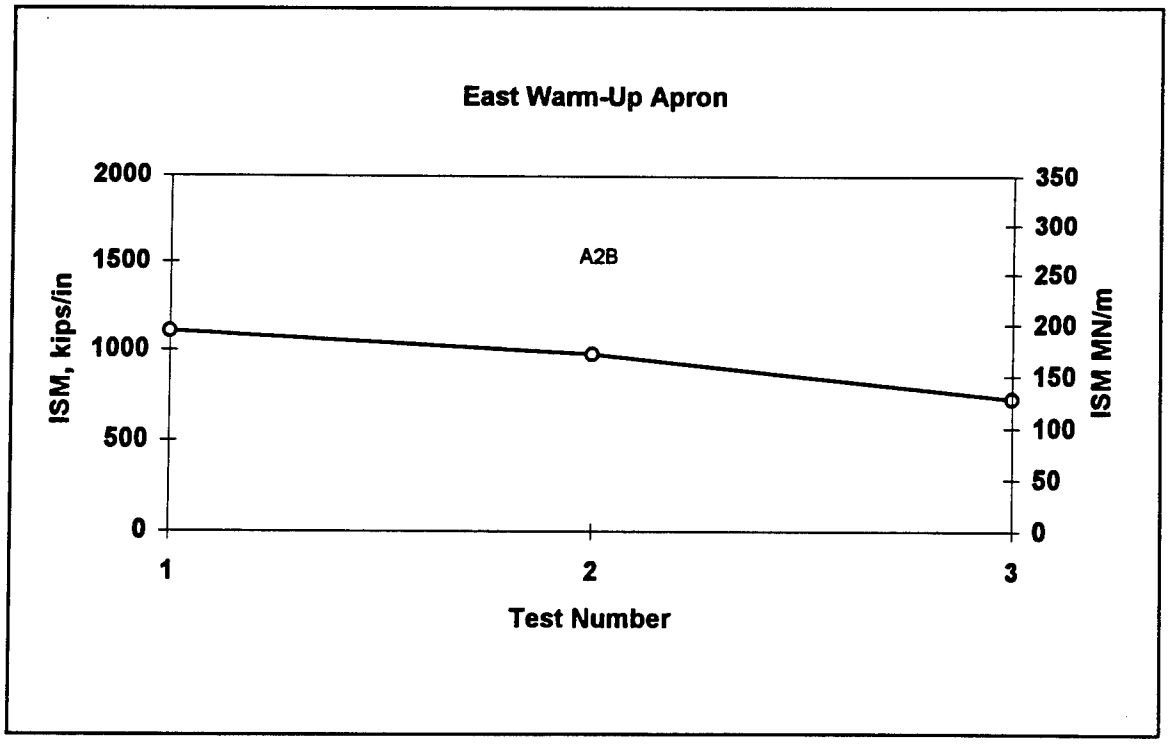

Figure B17. East Warm-up Apron, (A2B)

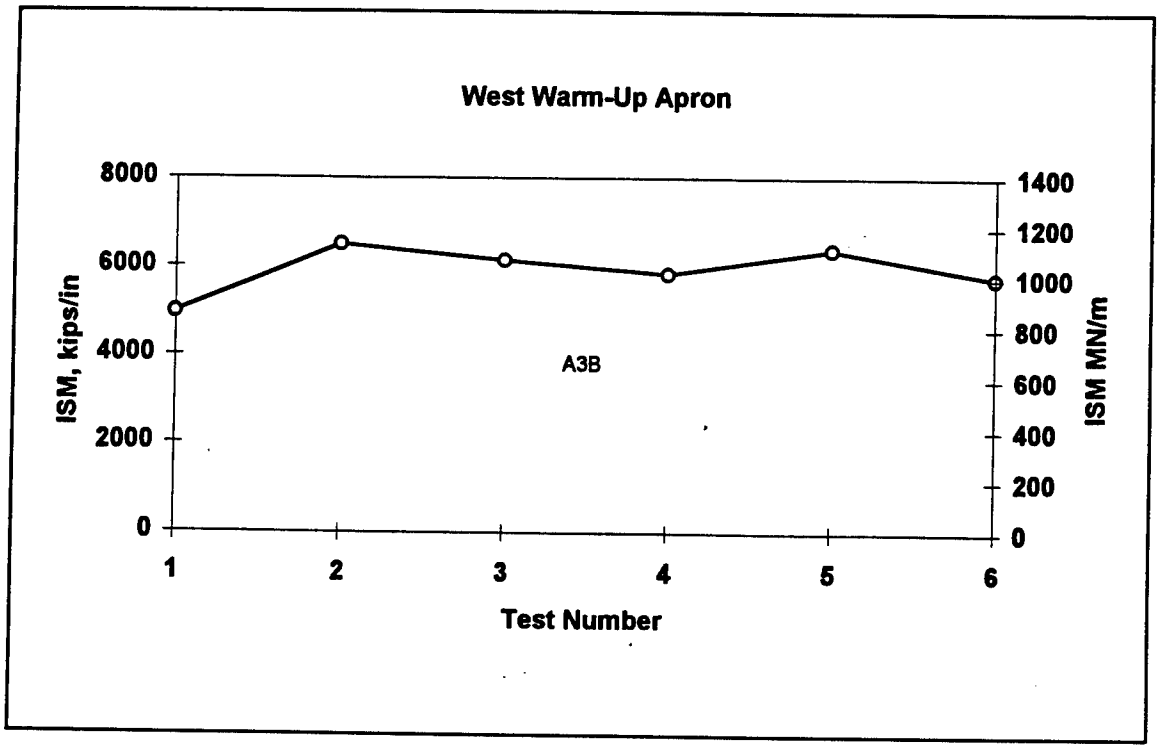

Figure B18. ISM profile, West Warm-up Apron, (A3B)

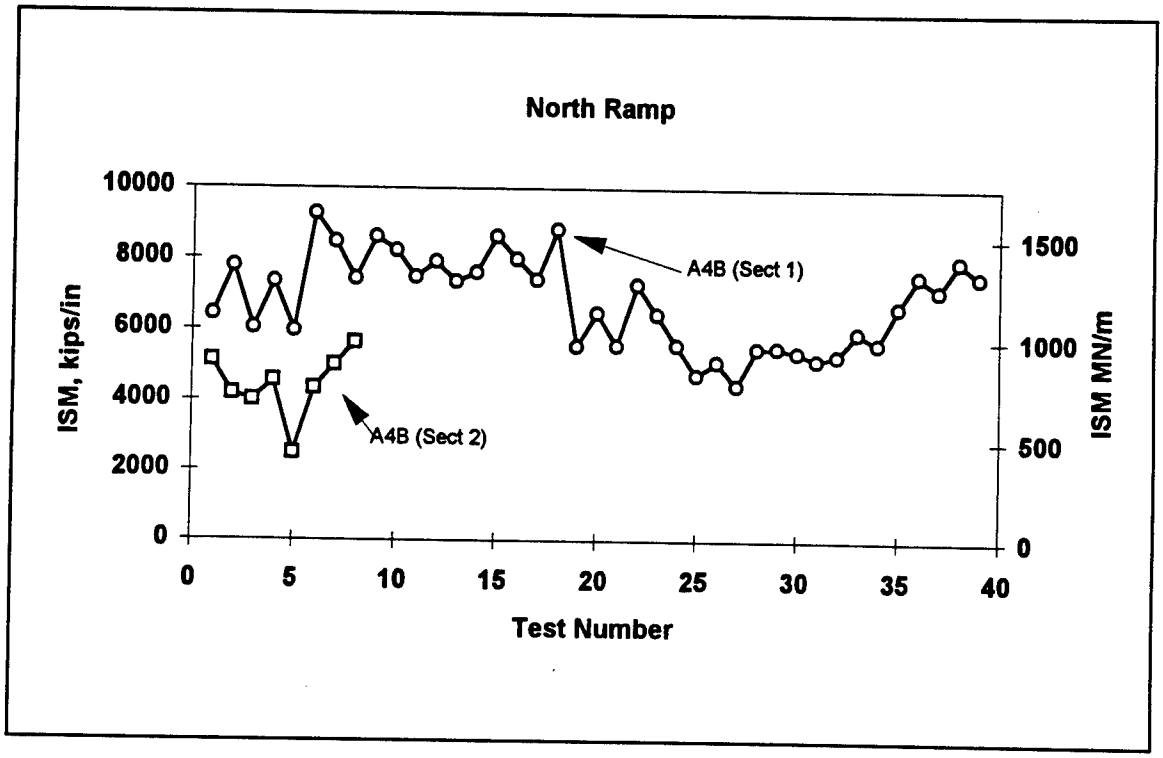

Figure B19. ISM profile, North Ramp, (A4B Sections 1 and 2)

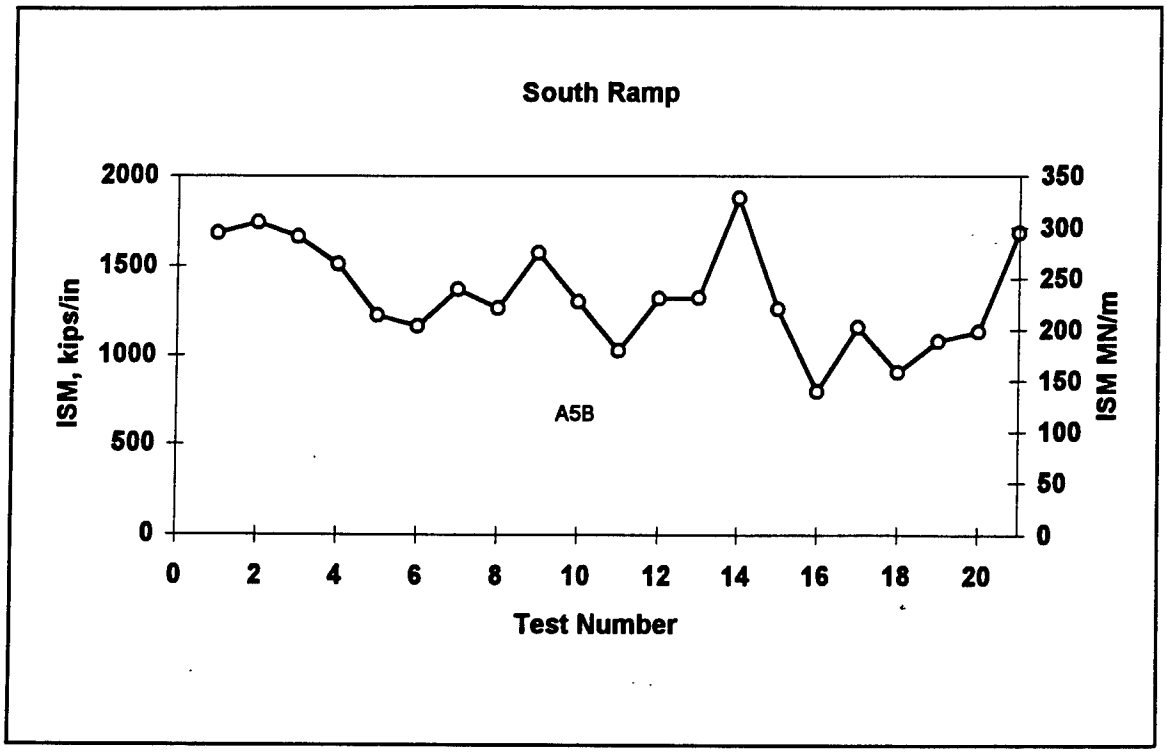

Figure B20. ISM profile, South Ramp, (A5B)

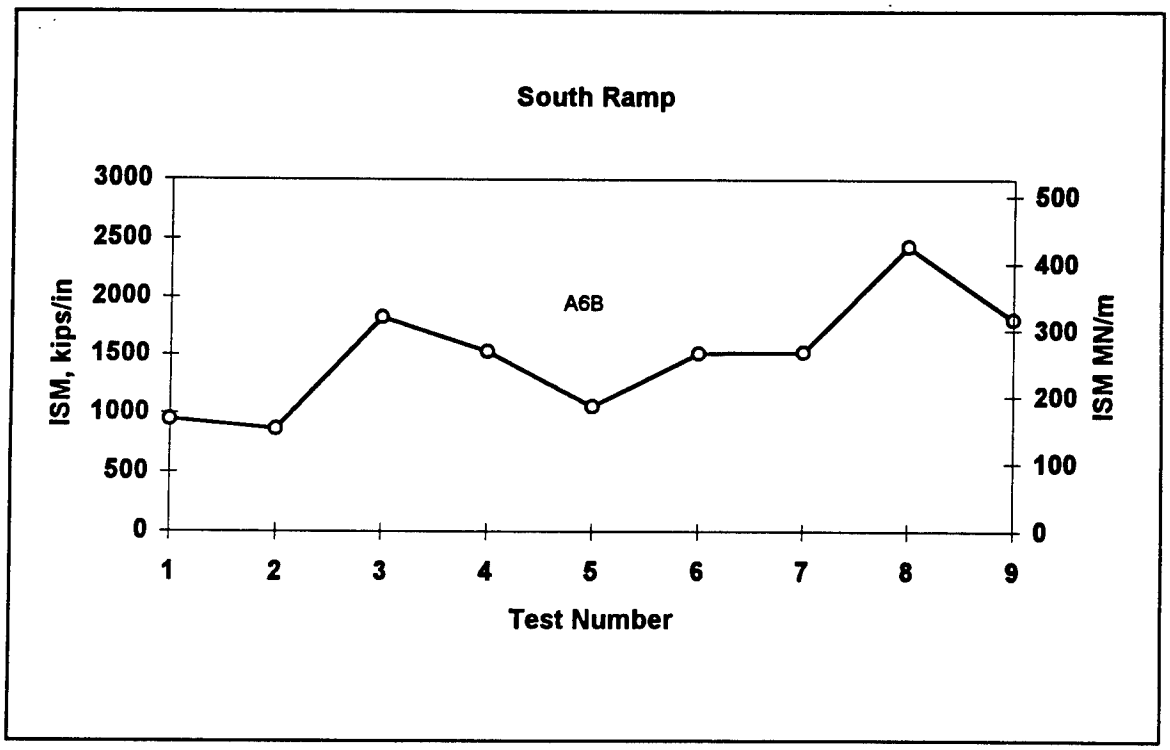

Figure B21. ISM profile, South Ramp, (A6B)

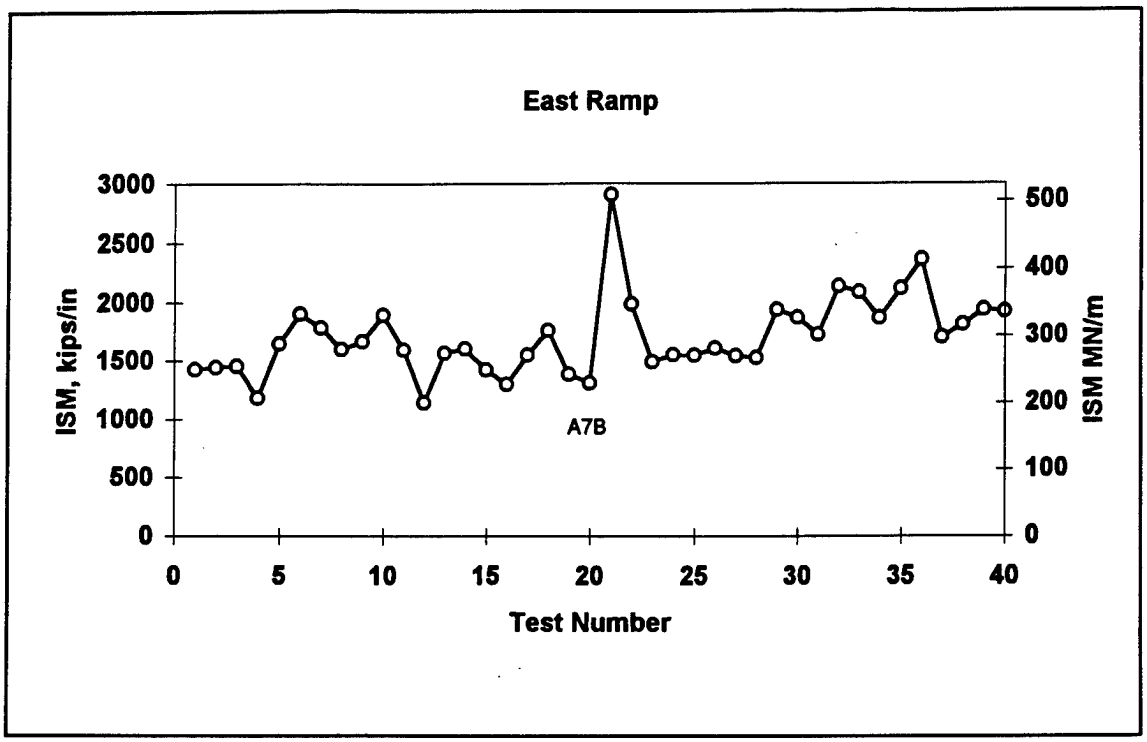

Figure B22. ISM profile, East Ramp, (A7B)

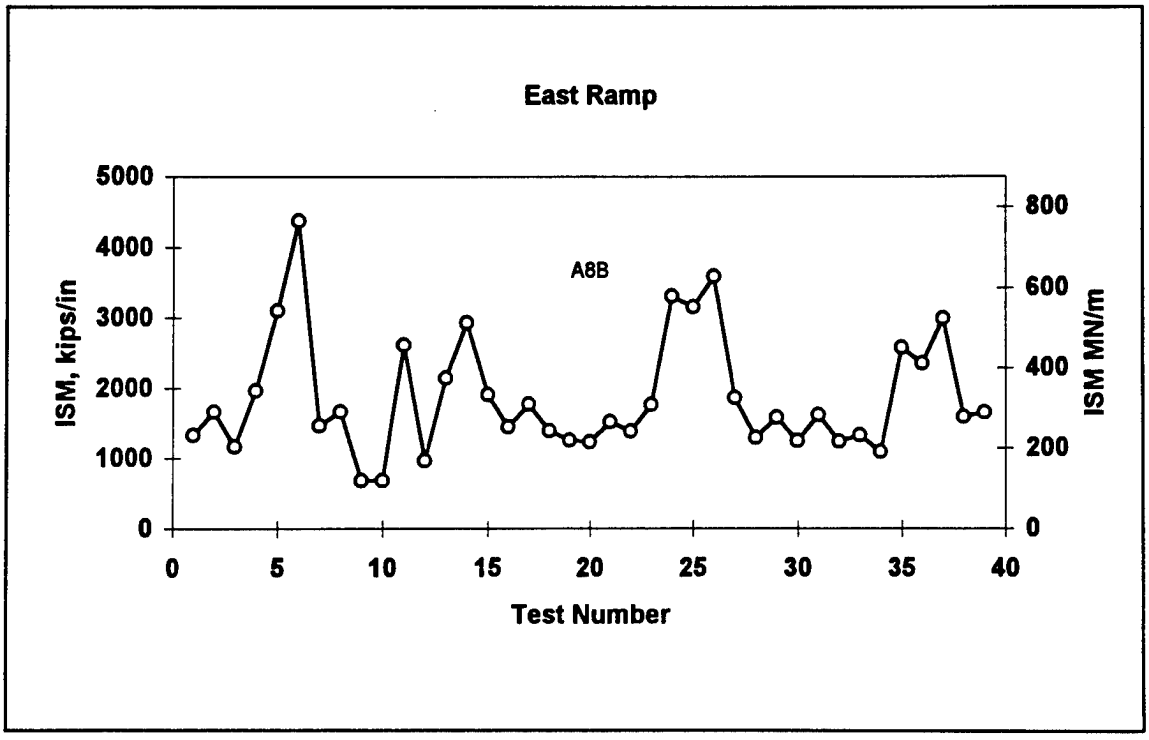

Figure B23. ISM profile, East Ramp, (A8B)

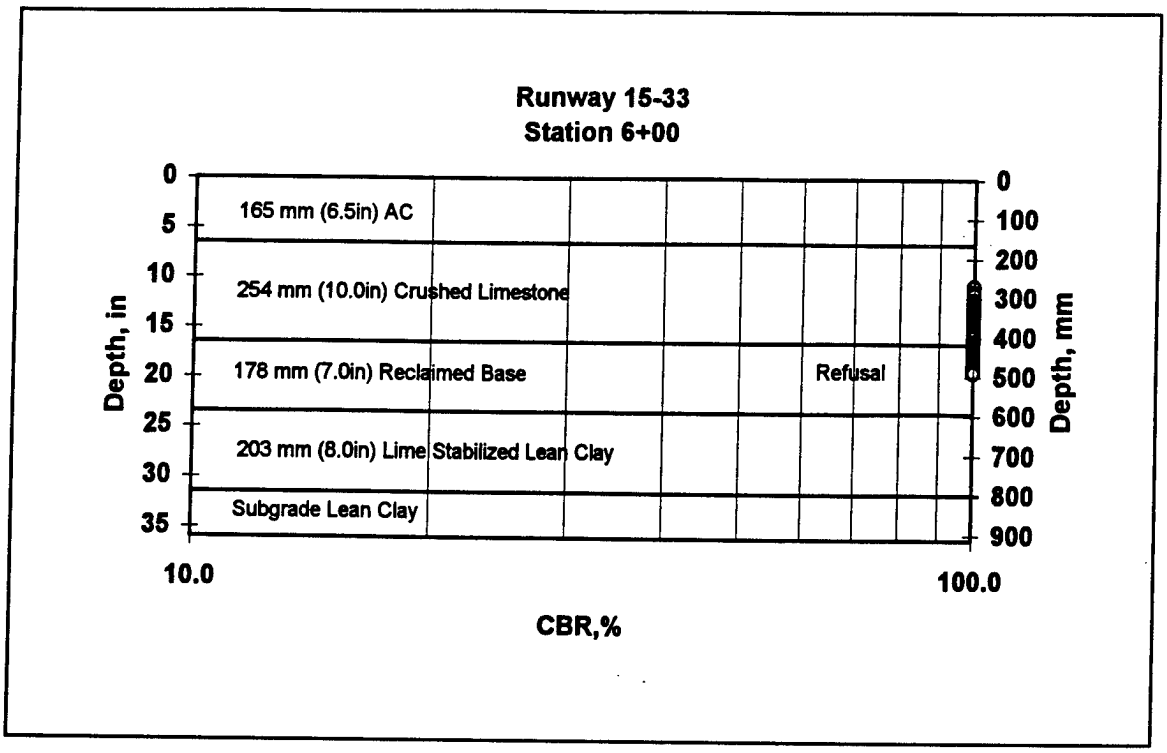

Figure B24. DCP test results, Runway 15-33, R1A, station 6+00

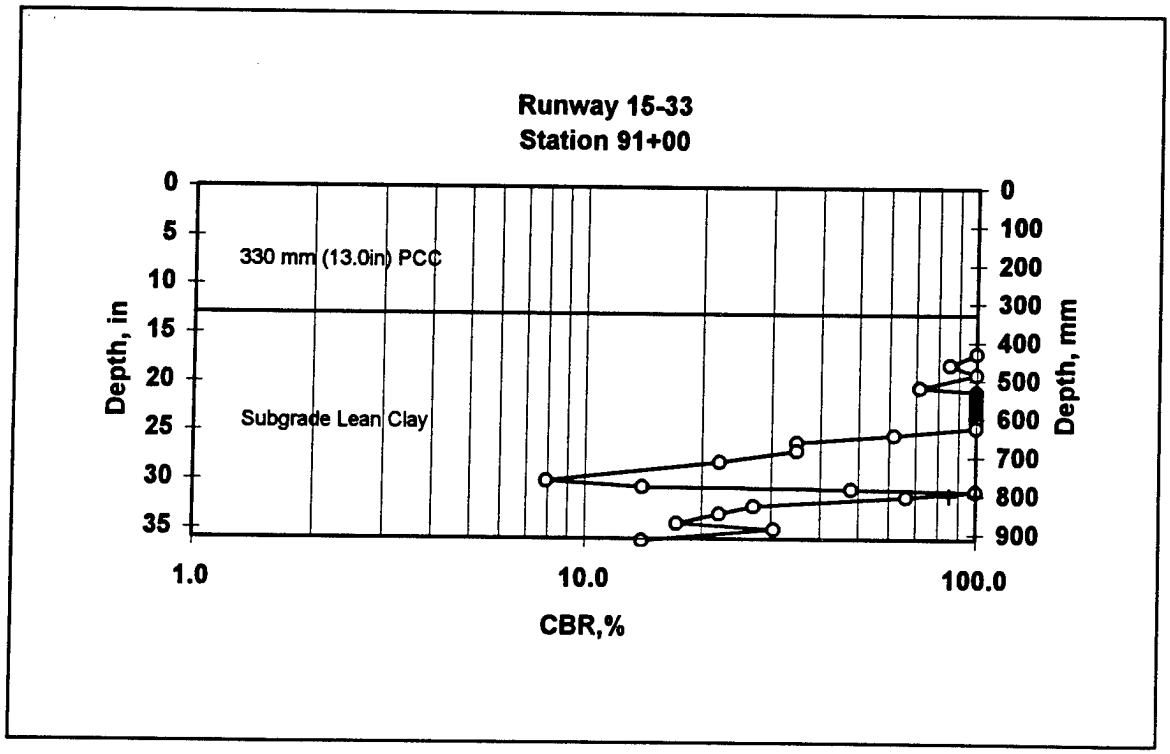

Figure B25. DCP test results, Runway 15-33, R7A, station 91+00

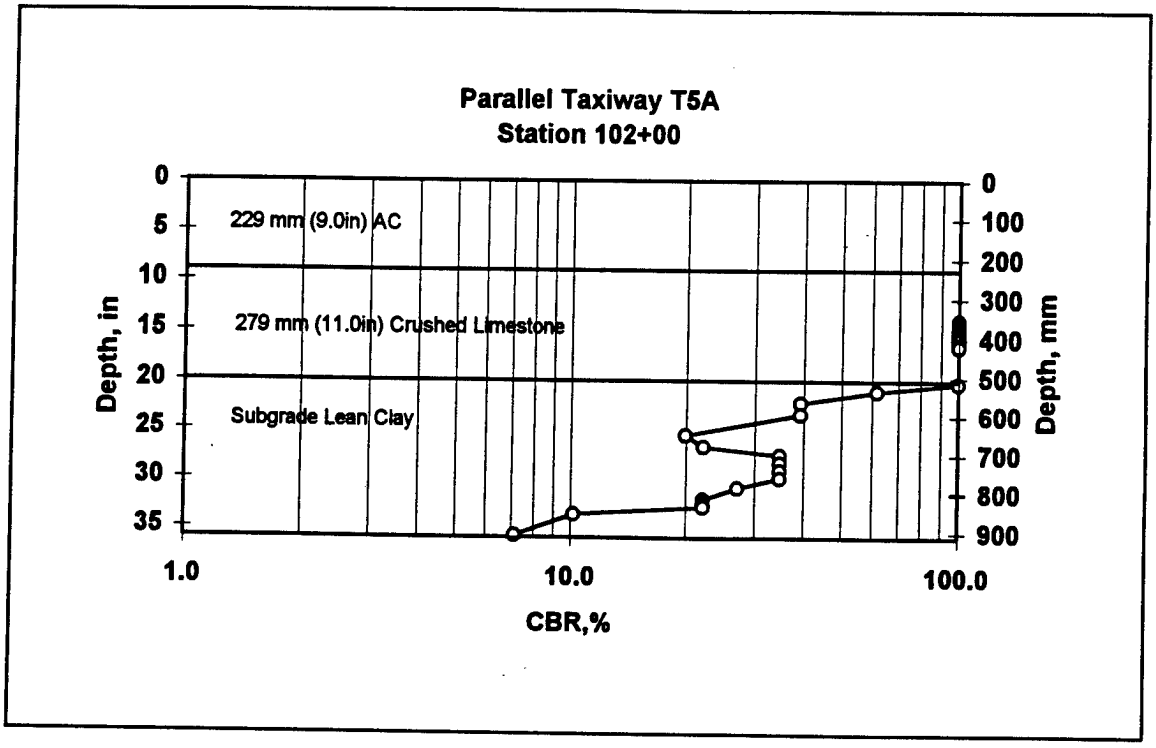

Figure B26. DCP test results, Parallel Taxiway, T5A, station 102+00

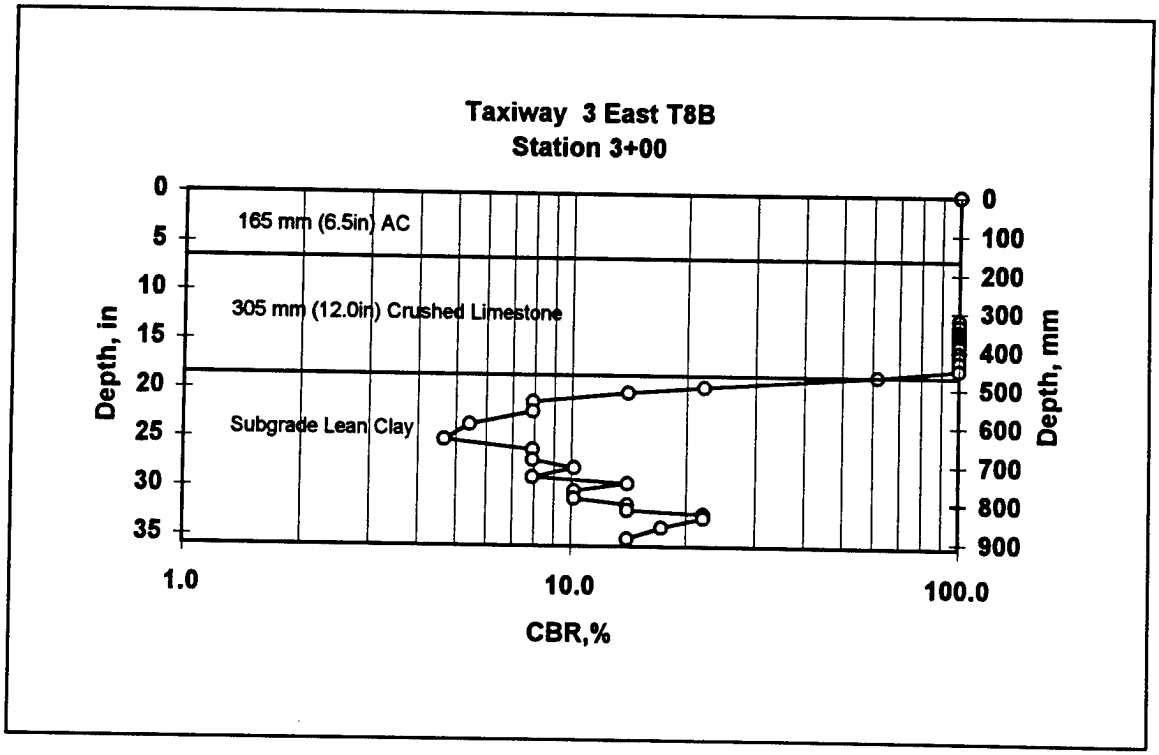

Figure B27. DCP test results, taxiway 3 east, T8B, station 3+00

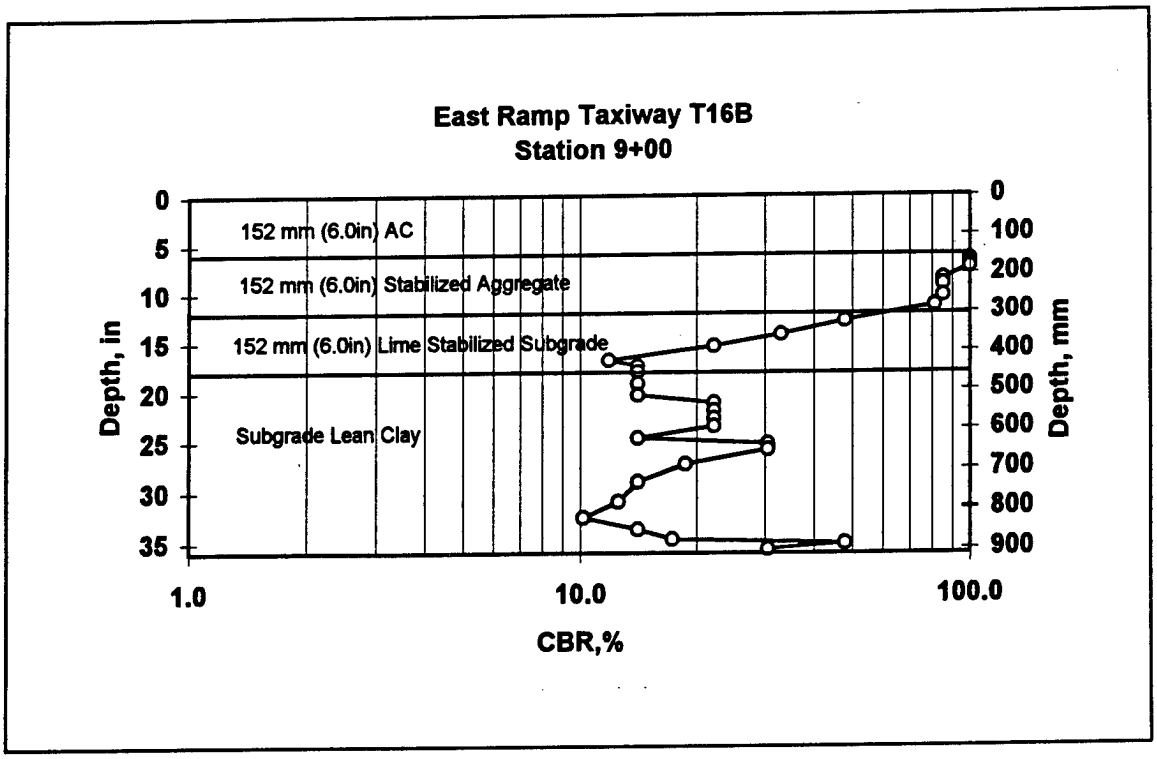

Figure B28. DCP test results, East Ramp Taxiway, T16B, station 9+00

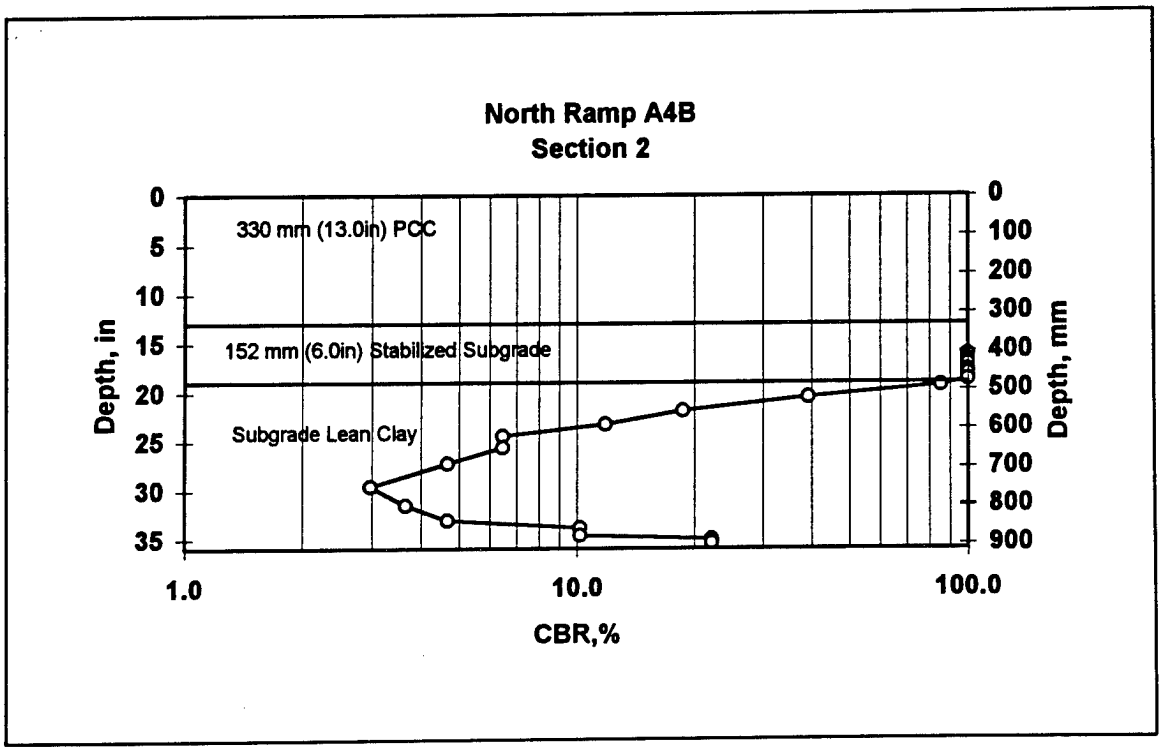

Figure B29. DCP test results, North Ramp, A4B Section 2

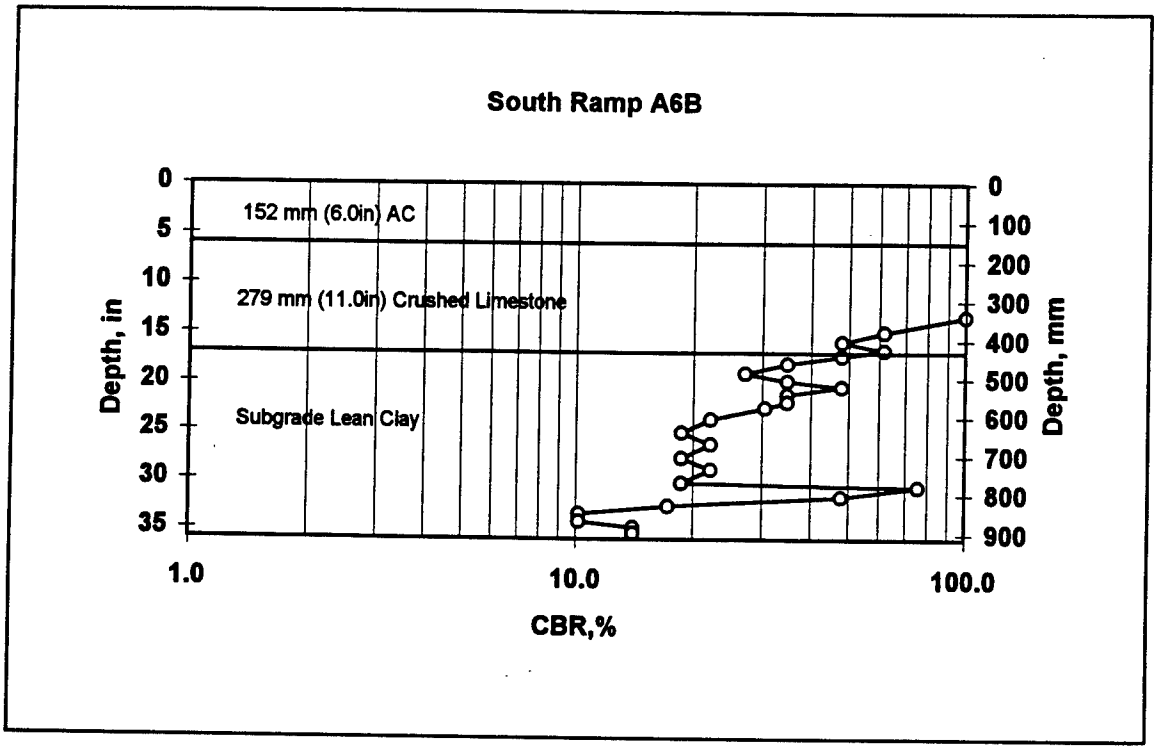

Figure B30. DCP test results, South Ramp, A6B

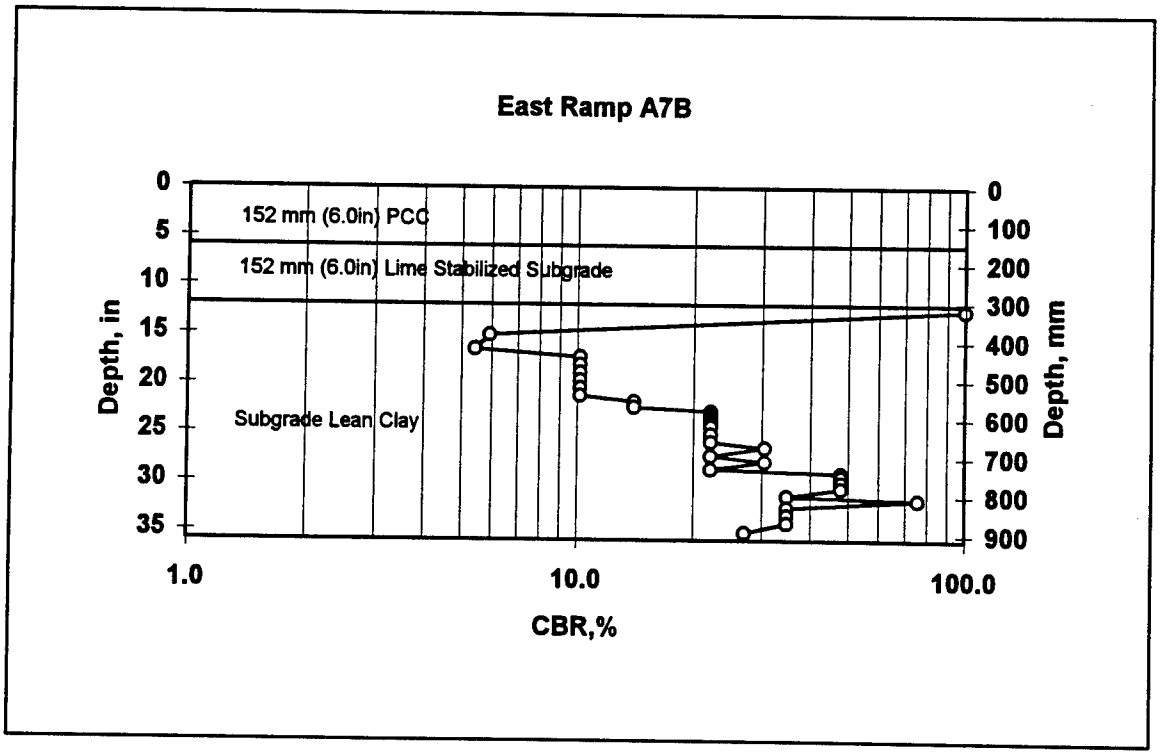

Figure B31. DCP test results, East Ramp, A7B

Table B1
Summary of Joint Ratio Test on PCC Pavements

Feature	Test Number	Load kN (lbs)	D0 μm (mils)	D12 μm (mils)	Joint Ratio,% D12/D0X100
R7A	91	233 (52,410)	427 (16.8)	86 (3.4)	20
R7A	94	229 (51,448)	445 (17.5)	137 (5.4)	31
R8A	98	232 (52,100)	363 (14.3)	114 (4.5)	31
				Average	27
A3B	2	231 (51,941)	460 (18.1)	152 (6.0)	33
A3B	4	230 (51,687)	452 (17.8)	150 (5.9)	33
				Average	33
A4B-1	10	229 (51,397)	378 (14.9)	140 (5.5)	37
A4B-1	5	230 (51,643)	257 (10.1)	76 (3.0)	30
A4B-1	18	225 (50,558)	257 (10.1)	81 (3.2)	32
A4B-1	23	225 (50,674)	307 (12.1)	175 (6.9)	57
A4B-1	29	225 (50,630)	325 (12.8)	246 (9.7)	76
A4B-1	34	227 (51,039)	254 (10.0)	109 (4.3)	43
				Average	46
A4B-2	3	226 (50,797)	307 (12.1)	279 (11.0)	91
A4B-2	6	221 (49,637)	523 (20.6)	257 (10.1)	49
				Average	70
A7B	504	213 (47,937)	1494 (58.8)	729 (28.7)	49
A7B	508	218 (48,918)	1732 (68.2)	1069 (42.1)	62
A7B	512	217 (48,755)	1087 (42.8)	678 (26.7)	62
A7B	518	218 (48,902)	828 (32.6)	754 (29.7)	91
A7B	524	220 (49,410)	978 (38.5)	831 (32.7)	85
A7B	528	218 (49,065)	945 (37.2)	851 (33.5)	90
A7B	534	218 (49,085)	772 (30.4)	599 (23.6)	78
				Average	74
A8B	538	217 (48,751)	818 (32.2)	660 (26.0)	81
A8B	503	214 (48,179)	1778 (70.0)	1036 (40.8)	58
A8B	514	226 (50,761)	610 (24.0)	406 (16.0)	67
A8B	520	222 (49,812)	1473 (58.0)	897 (35.3)	61
A8B	525	227 (51,055)	599 (23.6)	272 (10.7)	45
A8B	531	219 (49,180)	899 (35.4)	772 (30.4)	86
A8B	536	223 (50,217)	653 (25.7)	318 (12.5)	49
				Average	64

Table B2
NDT Tests Results, Representative Basins

Feature	Station or Test Number m (ft)	ISM MN/m (kips/in.)	Load kN (lb)	Deflection, μm (mils) D1	D2	D3	D4	D5	D6	D7
Runway 15-33										
R1A	1+83 (6+00)	275 (1,569)	224 (50,371)	815 (32.1)	523 (20.6)	244 (9.6)	112 (4.4)	53 (2.1)	33 (1.3)	28 (1.1)
R2C	4+27 (14+00)	390 (2,225)	231 (51,849)	592 (23.3)	467 (18.4)	272 (10.7)	173 (6.8)	114 (4.5)	79 (3.1)	58 (2.3)
R3C	12+50 (41+00)	232 (1,324)	228 (51,245)	983 (38.7)	592 (23.3)	335 (13.2)	201 (7.9)	132 (5.2)	94 (3.7)	69 (2.7)
R4C	19+51 (64+00)	257 (1,468)	235 (52,722)	912 (35.9)	516 (20.3)	284 (11.2)	183 (7.2)	132 (5.2)	99 (3.9)	76 (3.0)
R5C	22+56 (74+00)	275 (1,573)	223 (50,181)	810 (31.9)	587 (23.1)	335 (13.2)	188 (7.4)	107 (4.2)	69 (2.7)	48 (1.9)
R6C	26+82 (88+00)	330 (1,883)	227 (51,054)	688 (27.1)	488 (19.2)	241 (9.5)	117 (4.6)	61 (2.4)	33 (1.3)	23 (0.9)
R7A	27+74 (91+00)	1010 (5,769)	234 (52,500)	231 (9.1)	198 (7.8)	173 (6.8)	147 (5.8)	122 (4.8)	99 (3.9)	79 (3.1)
R8A	29+87 (98+00)	1322 (7,548)	232 (52,087)	175 (6.9)	155 (6.1)	137 (5.4)	117 (4.6)	99 (3.9)	84 (3.3)	71 (2.8)
Parallel Taxiway										
T1A	0+61 (2+00)	267 (1,526)	223 (50,070)	833 (32.8)	488 (19.2)	282 (11.1)	178 (7.0)	122 (4.8)	89 (3.5)	69 (2.7)
T2A	3+35 (11+00)	1456 (8,317)	226 (50,737)	155 (6.1)	119 (4.7)	99 (3.9)	84 (3.3)	66 (2.6)	51 (2.0)	41 (1.6)
T3A	22+25 (73+00)	368 (2,102)	224 (50,244)	607 (23.9)	427 (16.8)	272 (10.7)	173 (6.8)	112 (4.4)	76 (3.0)	56 (2.2)
T4A	26+21 (86+00)	407 (2,322)	226 (50,641)	554 (21.8)	307 (12.1)	160 (6.3)	91 (3.6)	64 (2.5)	46 (1.8)	36 (1.4)
T5A	28+65 (94+00)	271 (1,547)	218 (49,053)	805 (31.7)	546 (21.5)	343 (13.5)	221 (8.7)	147 (5.8)	104 (4.1)	76 (3.0)
Taxiway 3 West										
T6C	0+91 (3+00)	436 (2,491)	235 (52,818)	538 (21.2)	358 (14.1)	203 (8.0)	127 (5.0)	89 (3.5)	66 (2.6)	53 (2.1)
Taxiway 2 West										
T7C	1+22 (4+00)	371 (2,120)	238 (53,437)	640 (25.2)	320 (12.6)	196 (7.7)	152 (6.0)	127 (5.0)	109 (4.3)	94 (3.7)
Taxiway 3 East										
T8B	0+61 (2+00)	137 (2+00)	81 (18,206)	582 (23.3)	401 (15.8)	231 (9.1)	140 (5.5)	89 (3.5)	58 (2.3)	41 (1.6)
Taxiway 1 East										
T9B	0+91 (3+00)	254 (1,449)	227 (51,007)	894 (35.2)	599 (23.6)	330 (13.0)	160 (6.3)	66 (2.6)	28 (1.1)	15 (0.6)
Taxiway 2 East										
T10B	1+52 (5+00)	257 (1,465)	222 (49,974)	866 (34.1)	490 (19.3)	259 (10.2)	173 (6.8)	127 (5.0)	104 (4.1)	84 (3.3)

(Continued)

Table B2 (Concluded)

Feature	Station or Test Number m (ft)	ISM MN/m (kips/in.)	Load kN (lb)	Deflection, μm (mils) D1	D2	D3	D4	D5	D6	D7
East Parallel Taxiway										
T11B, Sec 1	3+35 (11+00)	180 (1,026)	225 (50,419)	1,247 (49.1)	711 (28.0)	386 (15.2)	236 (9.3)	170 (6.7)	137 (5.4)	109 (4.3)
T11B, Sec 2	0+91 (3+00)	179 (1,025)	224 (50,371)	1,247 (49.1)	810 (31.9)	452 (17.8)	234 (9.2)	117 (4.6)	69 (2.7)	43 (1.7)
East Ramp Taxiways										
T12B	1+83 (6+00)	150 (854)	124 (27,846)	828 (32.6)	429 (16.9)	175 (6.9)	97 (3.8)	71 (2.8)	56 (2.2)	48 (1.9)
T13B	0+30 (1+00)	116 (661)	124 (27,840)	1,069 (42.1)	528 (20.8)	239 (9.4)	127 (5.0)	76 (3.0)	56 (2.2)	41 (1.6)
T14B	0+00	101 (576)	120 (27,438)	1,209 (47.6)	480 (18.9)	196 (7.7)	127 (5.0)	91 (3.6)	66 (2.6)	51 (2.0)
T15B, Sec 1	0+00	145 (827)	127 (28,622)	879 (34.6)	399 (15.7)	170 (6.7)	99 (3.9)	71 (2.8)	51 (2.0)	41 (1.6)
T15B, Sec 2	0+91 (3+00)	104 (594)	120 (27,041)	1,156 (45.5)	564 (22.2)	226 (8.9)	107 (4.2)	66 (2.6)	53 (2.1)	46 (1.8)
T16B	1+83 (6+00)	114 (653)	75 (16,933)	658 (25.9)	305 (12.0)	130 (5.1)	71 (2.8)	43 (1.7)	30 (1.2)	23 (0.9)
East Ramp Hoverlane										
T17B	1+83 (6+00)	84 (480)	80 (17,872)	945 (37.2)	503 (19.8)	226 (8.9)	107 (4.2)	58 (2.3)	41 (1.6)	33 (1.3)
T19B	3+05 (10+00)	148 (847)	171 (38,399)	1,151 (45.3)	561 (22.1)	234 (9.2)	117 (4.6)	74 (2.9)	56 (2.2)	48 (1.9)
Warm-up Aprons										
A2B East	0+91 (3+00)	128 (730)	163 (36,607)	1273 (50.1)	866 (34.1)	465 (18.3)	234 (9.2)	132 (5.2)	81 (3.2)	56 (2.2)
A3B West	4	1,021 (5,828)	246 (55,375)	241 (9.5)	216 (8.5)	193 (7.6)	170 (6.7)	147 (5.8)	130 (5.1)	109 (4.3)
North Ramp										
A4B, Sec 1	35	1169 (6,675)	229 (51,404)	196 (7.7)	160 (6.3)	137 (5.4)	114 (4.5)	94 (3.7)	76 (3.0)	61 (2.4)
A4B, Sec 2	6	759 (4,333)	234 (52,007)	305 (12.0)	274 (10.8)	251 (9.9)	226 (8.9)	198 (7.8)	173 (6.8)	147 (5.8)
South Ramp										
A5B	12	230 (1,316)	227 (50,943)	983 (38.7)	566 (22.3)	292 (11.5)	150 (5.9)	79 (3.1)	48 (1.9)	33 (1.3)
A6B	7	267 (1,526)	228 (51,293)	853 (33.6)	457 (18.0)	226 (8.9)	117 (4.6)	66 (2.6)	46 (1.8)	30 (1.2)
East Ramp										
A7B	25	270 (1,542)	225 (50,586)	833 (32.8)	671 (26.4)	493 (19.4)	356 (14.0)	251 (9.9)	178 (7.0)	124 (4.9)
A8B	8	291 (1,659)	174 (39,002)	597 (23.5)	498 (19.6)	373 (14.7)	269 (10.6)	188 (7.4)	130 (5.1)	86 (3.4)

Table B3
Summary of Modulus Values

Feature	Surface Modulus MPa (psi[1])	Base Modulus MPA (psi[1])	Subgrade Modulus MPA (psi[1])	Estimated Depth to Rigid Boundary mm (in.)
AC Pavements				
R1A	4,809 (697,451)	382 (55,353)	177 (25,682)	1,651 (65)
R2C	12,080 (1,752,038)	599 (86,935)	174 (25,283)	2,489 (98)
R3C	3,732 (541,313)	427 (61,948)	194 (28,209)	3,277 (129)
R4C	3,253 (471,840)	532 (77,153)	231 (33,458)	3,937 (155)
R5C	7,188 (1,042,522)	403 (58,419)	127 (18,466)	1,981 (78)
R6C	7,334 (1,063,769)	447 (64,886)	158 (22,951)	1,600 (63)
T1A	11,292 (1,637,759)	568 (82,358)	297 (43,048)	6,096 (240)
T3A	4,864 (705,523)	840 (121,883)	191 (27,667)	2,515 (99)
T4A	3,199 (463,932)	726 (105,306)	265 (38,426)	2,438 (96)
T5A	3,414 (495,123)	709 (102,813)	172 (24,981)	3,353 (132)
T6C	11,848 (1,718,439)	790 (114,553)	227 (32,933)	2,769 (109)
T7C	8,291 (1,202,478)	1,179 (185,508)	253 (36,666)	6,096 (240)
T8B	2,760 (400,263)	318 (46,175)	100 (14,562)	2,946 (116)
T9B	6,075 (881,154)	463 (67,168)	111 (16,146)	1,295 (51)
T10B	7,224 (1,047,840)	658 (95,379)	284 (41,230)	6,096 (240)
T11B, Sec 1	5,318 (771,372)	497 (72,091)	215 (31,181)	6,096 (240)
T11B, Sec 2	3,304 (479,243)	302 (43,859)	134 (19,487)	2,134 (84)
T12B	9,191 (1,333,114)[2]	518 (75,182)	215 (31,117)	3,429 (135)
T13B	9,261 (1,343,299)[2]	436 (63,224)	130 (18,920)	2,210 (87)

(Continued)

[1] Backcalculated modulus values using WESDEF.
[2] Assigned based on temperature at time of testing.

Table B3 (Concluded)

Feature	Surface Modulus MPa (psi[1])	Base Modulus MPA (psi[1])	Subgrade Modulus MPA (psi[1])	Estimated Depth to Rigid Boundary mm (in.)
AC Pavements (Continued)				
T14B	9,261 (1,343,299)[2]	322 (46,681)	154 (22,358)	2,438 (96)
T15B, Sec 1	8,604 (1,247,918)[2]	475 (68,908)	240 (34,788)	3,759 (148)
T15B, Sec 2	8,672 (1,257,809)[2]	311 (45,101)	154 (22,334)	2,565 (101)
T16B	813 (117,920)	421 (61,084)	120 (17,419)	2,235 (88)
T17B	987 (143,143)	241 (35,070)	64 (9,289)	1,575 (62)
T19B	1,283 (186,091)	448 (65,043)	159 (23,100)	1,930 (76)
A2B	3,572 (518,090)	407 (59,030)	67 (9,787)	1,701 (67)
A5B	2,660 (385,847)	914 (132,537)	168 (24,356)	1,778 (70)
A6B	3,151 (457,031)	723 (104,835)	279 (40,479)	2,261 (89)
PCC Pavements				
R7A	55,430 (8,039,484)	--	144 (20,927)	2,438 (96)
R8A	60,016 (8,704,568)	--	147 (21,293)	2,438 (96)
T2A	42,332 (6,139,754)	--	320 (46,489)	2,515 (99)
A3B	41,587 (6,031,740)	--	224 (32,486)	6,096 (240)
A4B, Sec 1	58,101 (8,426,889)	--	305 (58,101)	2,515 (99)
A4B, Sec 2	60,089 (8,715,151)	--	153 (22,203)	6,096 (240)
A7B	52,713 (7,645,404)	--	101 (14,626)	2,489 (98)
A8B	55,386 (8,033,164)	--	105 (15,183)	2,489 (98)

Appendix C
Pavement Condition Survey and Results

Pavement Condition Survey

A pavement condition survey is a visual inspection of the airfield pavements to determine the present surface condition. The condition survey consists of inspecting the pavement surface for the various types of distresses, determining the severity of each distress, and measuring the quantity of each distress. The condition survey provides estimated quantities of each distress type and severity with the PCI for each feature. The PCI is a numerical indicator based on a scale from 0 to 100 and is determined by measuring pavement surface distress that reflects the surface condition of the pavement. Pavement condition ratings (from excellent to failed) are assigned to different levels of PCI values. These ratings and their respective PCI value definitions are shown in Figure C1. The distress types, distress severities, methods of survey, and PCI calculation are described in ASTM D 5340-93.

Condition survey procedure

The PCI and estimated distress quantities are determined for each feature. The information is based on inspection of a selected number of sample units. Sample units are subdivisions of a feature used exclusively to facilitate the inspection process and reduce the effort needed to determine distress quantities and the PCI. Each feature was divided into sample units. The sample units for AC pavement features were approximately 465 sq m (5,000 sq ft), and the sample units for the PCC pavement features contained approximately 20 slabs. The statistical sampling technique was used to determine the number of sample units to be inspected to provide a 95 percent confidence level. Sample units were chosen along the center line of the runway and taxiways and were chosen randomly on aprons. The stationing and direction of survey for the runway and taxiways are shown in Figure C2. The locations of the sample units on the apron features are shown in Figures C3 through C5. After the sample units were inspected, the mean PCI of all sample units within a feature

was calculated and the feature was rated as to its condition: excellent, very good, good, fair, poor, very poor, and failed.

Analysis of PCI Data

The distress information collected during the survey was used with the Micro Paver program to estimate the quantities of distress types for each feature. This information is presented along with the PCI, general rating, and distress mechanism (load, climate, or other) in Appendix E. The major distress types observed on the PCC pavements were corner breaks, linear cracking, patching, shattered slabs, joint spalls, and corner spalls. The major distress types found on the AC pavements were alligator cracking, block cracking, longitudinal and transverse cracking, slippage cracks, and rutting. Photographs C1 through C8 show various types of distresses observed during the survey.

AR 420-72 (Headquarters, Department of the Army 1991a) requires that all airfield pavements be maintained at or above the following PCI ranges:

All runways and primary taxiways, 65 to 75.
All aprons and secondary taxiways, 40 to 55.

Recommendations to apply maintenance or repair to improve existing PCI values are presented in Table 3-2. These were developed based on a decision process by which the pavement engineer can select from multiple alternatives after giving consideration to the surface condition and structural capacity of the pavement feature. In this process, both the PCI condition rating and the NDT structural rating are required. The results of these two ratings are used to follow a flowchart that allows the determination of the most appropriate work classification category (maintenance, repair, or construction). The recommendations shown in Table 3-2 were selected from maintenance, repair, and construction alternatives suggested for various distresses. The alternatives are shown in Tables 3-3 and 3-4. In many instances, the performance of a specific alternative depends upon the geographical location and expertise of local contractors. Therefore, it is suggested that the local DPW personnel review all recommendations. Local costs for the approved alternatives can then be used with the Micro PAVER program to obtain a reasonable cost estimate. All structural improvements or construction should be in accordance with TM 5-825-1/AFM 32-8008 Vol. 1 (Headquarters, Departments of the Army and the Air Force 1994) which requires PCC, or composite pavements with PCC overlay, at runway ends and for the primary taxiway and parking apron systems.

Condition survey results

A summary of the pavement condition survey results is shown in tabular form in Table C1. Table C1 lists the sample unit number, location, PCI, and rating of each sample unit inspected. The mean PCI for each feature was then calculated to determine the general condition or rating of the feature as shown in Figure C6. A comparison of the 1988, 1993 and 1995 PCI results is summarized in Table C2. The largest change in PCI occurred in feature R2C on the runway which had a PCI decrease from 71 to about 31.

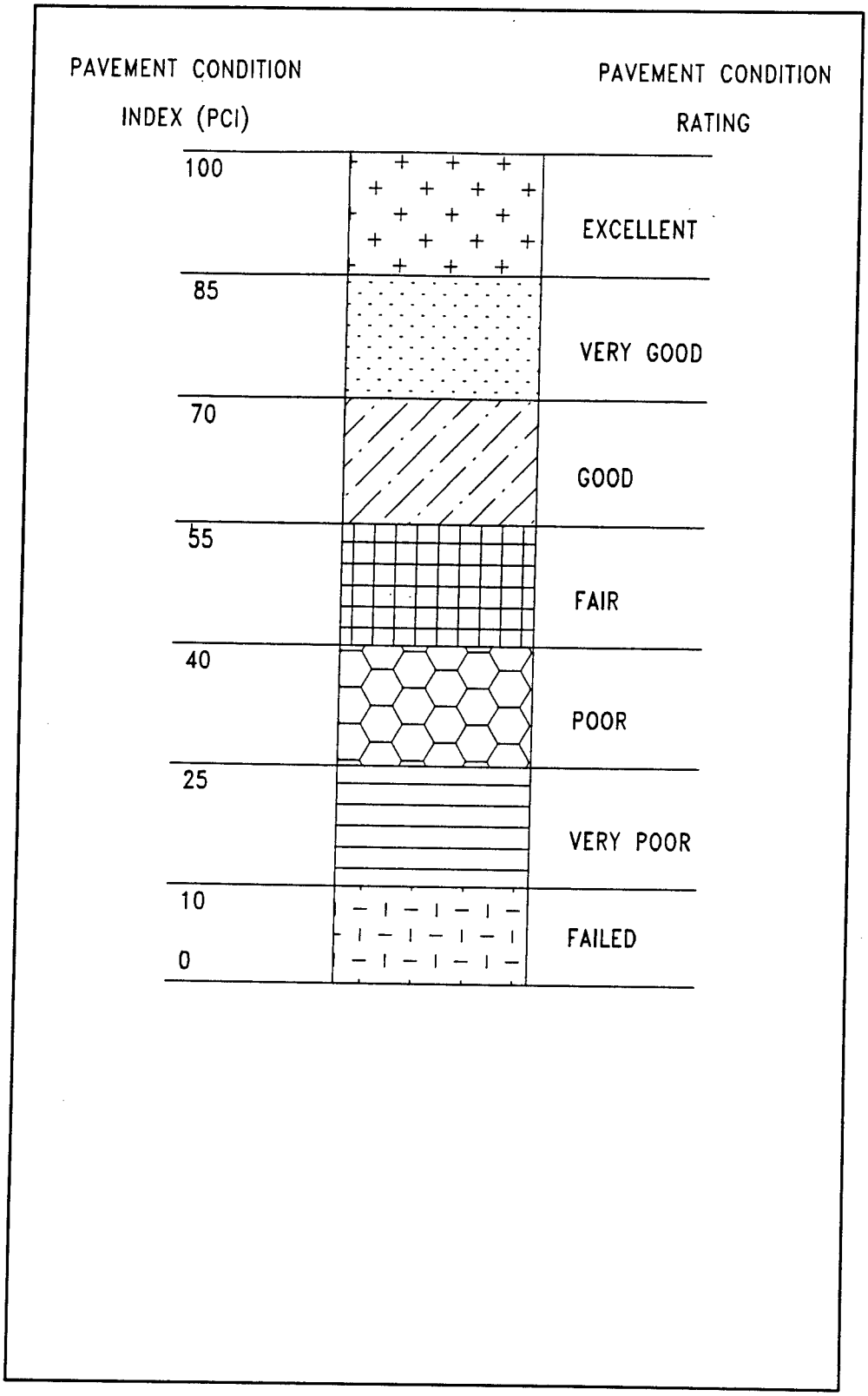

Figure C1. Scale for pavement condition rating

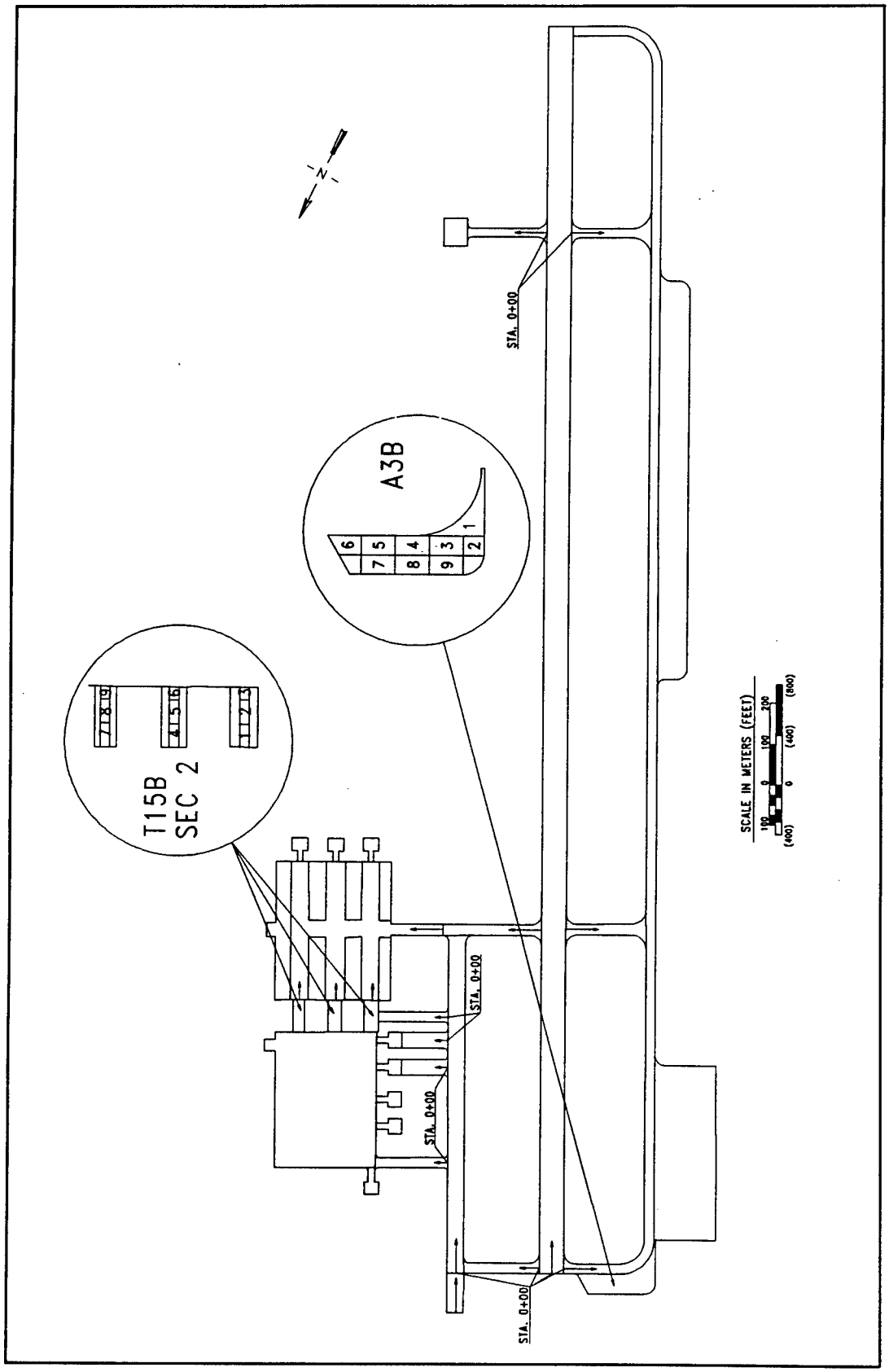

Figure C2. PCI location and direction of survey

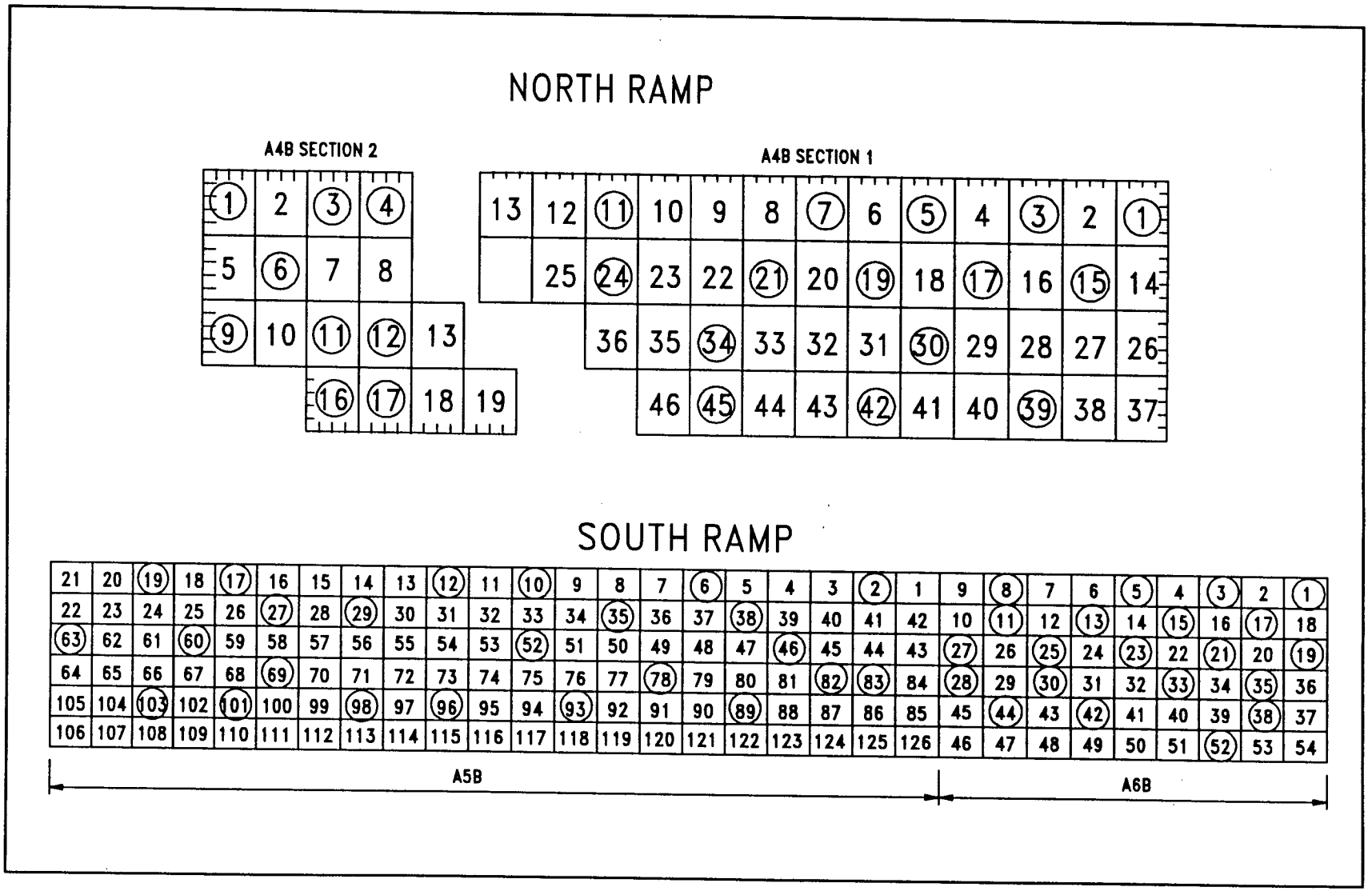

Figure C3. Sample unit layout, features A4B, A5B, and A6B

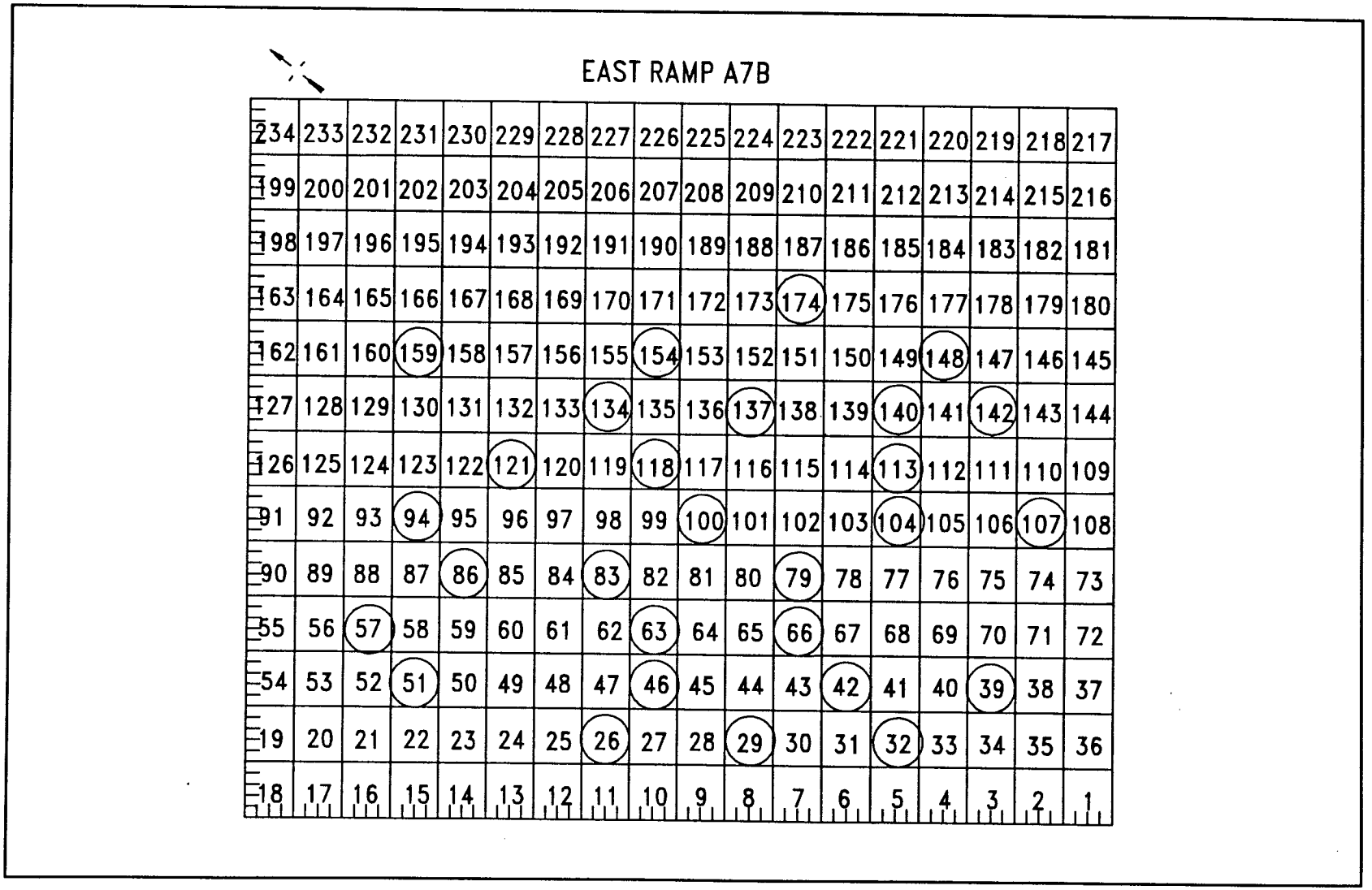

Figure C4. Sample unit layout, feature A7B

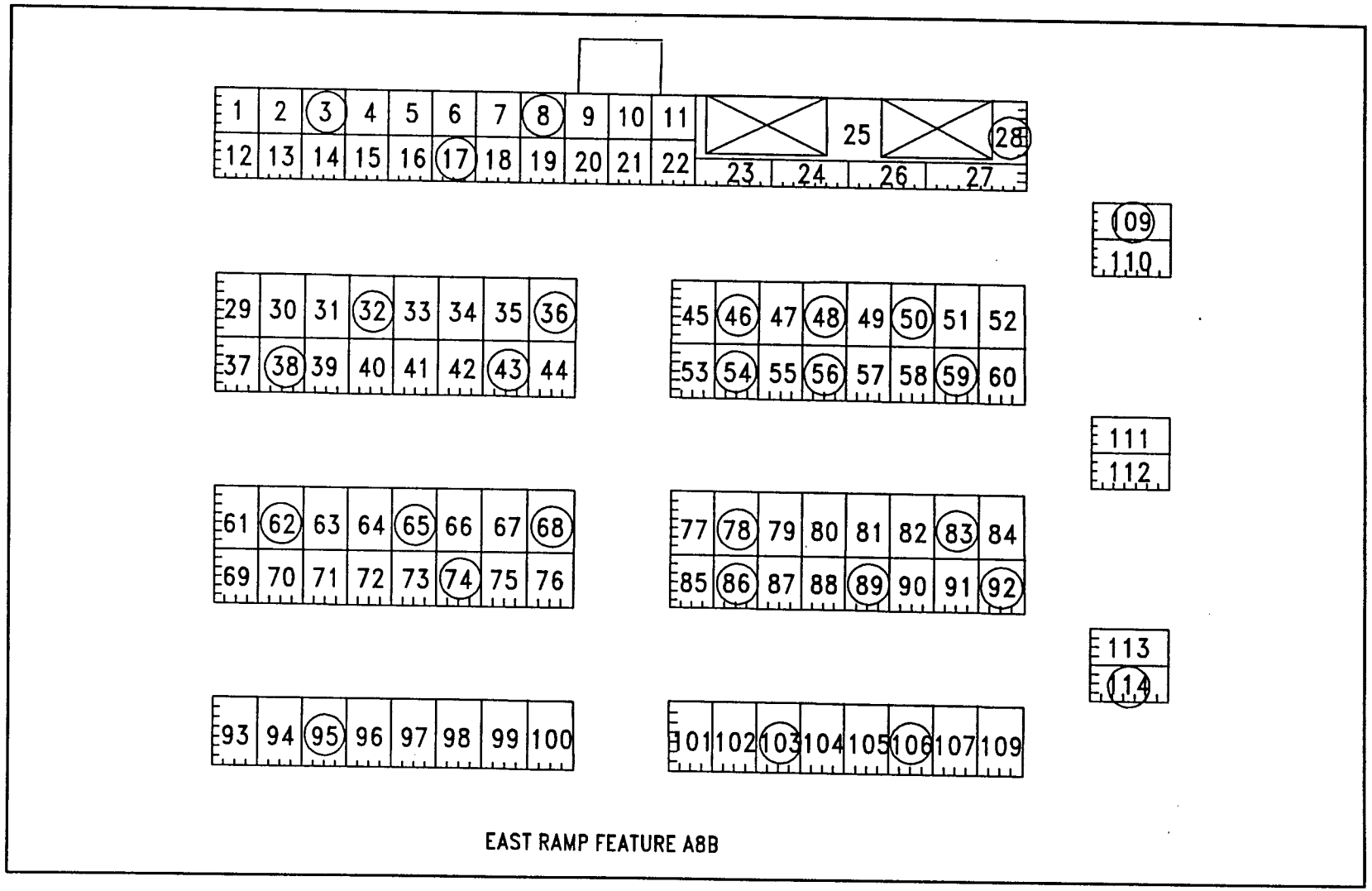

Figure C5. Sample unit layout, feature A8B

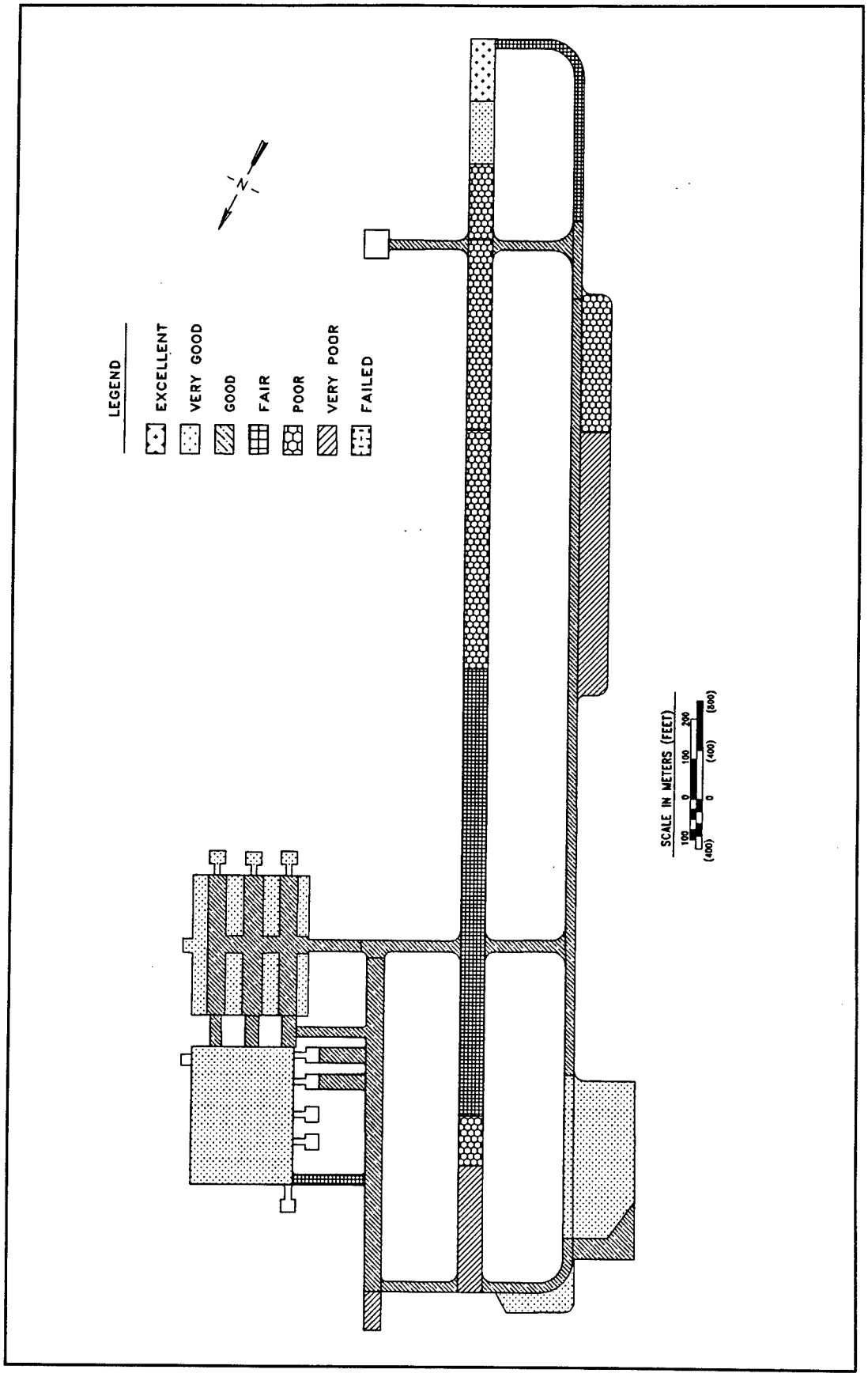

Figure C6. Pavement condition rating summary

Table C1
Pavement Condition Survey Results

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
Runway 15-33							
R1A	1	0+00	0+30 (1+00)	40	Poor	20	Very poor
	3	0+61 (2+00)	0+91 (3+00)	9	Failed		
	4	0+91 (3+00)	1+22 (4+00)	19	Very poor		
	5	1+22 (4+00)	1+52 (5+00)	17	Very poor		
	6	1+52 (5+00)	1+83 (6+00)	15	Very poor		
	7	1+83 (6+00)	2+13 (7+00)	23	Very poor		
	9	2+44 (8+00)	2+74 (9+00)	26	Poor		
	10	2+74 (9+00)	3+05 (10+00)	18	Very poor		
R2C	11	3+05 (10+00)	3+35 (11+00)	22	Very poor	31	Poor
	12	3+35 (11+00)	3+66 (12+00)	25	Very poor		
	13	3+66 (12+00)	3+96 (13+00)	37	Poor		
	14	3+96 (13+00)	4+27 (14+00)	43	Fair		
R3C	15	4+27 (14+00)	4+57 (15+00)	45	Fair	45	Fair
	16	4+57 (15+00)	4+88 (16+00)	28	Poor		
	17	4+88 (16+00)	5+18 (17+00)	55	Fair		
	18	5+18 (17+00)	5+48 (18+00)	59	Good		
	20	5+79 (19+00)	6+10 (20+00)	47	Fair		
	21	6+10 (20+00)	6+40 (21+00)	49	Fair		
	25	7+32 (24+00)	7+62 (25+00)	64	Good		
	26	7+62 (25+00)	7+92 (26+00)	54	Fair		
	30	8+84 (29+00)	9+14 (30+00)	64	Good		
	31	9+14 (30+00)	9+45 (31+00)	59	Good		
	33	9+75 (32+00)	10+06 (33+00)	44	Fair		
	34	10+06 (33+00)	10+36 (34+00)	31	Poor		
	35	10+36 (34+00)	10+67 (35+00)	22	Very poor		
	40	11+89 (39+00)	12+19 (40+00)	36	Poor		
	42	12+50 (41+00)	12+80 (42+00)	35	Poor		
	43	12+80 (42+00)	13+11 (43+00)	59	Good		
	46	16+72 (45+00)	14+02 (46+00)	43	Fair		
	49	14+63 (48+00)	14+94 (49+00)	39	Poor		
R4C	51	15+24 (50+00)	15+54 (51+00)	17	Very poor	28	Poor
	52	15+54 (51+00)	15+85 (52+00)	33	Poor		
	53	15+85 (52+00)	16+15 (53+00)	32	Poor		
	57	17+07 (56+00)	17+37 (57+00)	31	Poor		
	60	17+98 (59+00)	18+29 (60+00)	34	Poor		
	66	19+81 (65+00)	20+12 (66+00)	28	Poor		
	68	20+42 (67+00)	20+73 (68+00)	21	Very poor		
R5C	70	21+03 (69+00)	21+34 (70+00)	28	Poor	26	Poor
	73	21+95 (72+00)	22+25 (73+00)	27	Poor		
	76	22+86 (75+00)	23+16 (76+00)	25	Very poor		
	78	23+47 (77+00)	23+77 (78+00)	34	Poor		
	81	24+38 (80+00)	24+69 (81+00)	23	Very poor		
	83	24+99 (82+00)	25+30 (83+00)	20	Very poor		
R6C	84	25+30 (83+00)	25+60 (84+00)	39	Poor	34	Poor
	86	25+91 (85+00)	26+21 (86+00)	4	Failed		
	87	26+21 (86+00)	26+52 (87+00)	31	Poor		
	88	26+52 (87+00)	26+82 (88+00)	36	Poor		
	89	26+82 (88+00)	27+13 (89+00)	60	Good		
R7A	91	27+54 (90+35)	27+91 (91+60)	69	Good	83	Very good
	92	27+91 (91+60)	28+30 (92+85)	86	Excellent		
	93	28+30 (92+85)	28+68 (94+10)	90	Excellent		
	94	28+68 (94+10)	29+06 (95+35)	88	Excellent		

(Sheet 1 of 6)

Table C1 (Continued)

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
Runway 15-33							
R8A	95	29+06 (95+35)	29+44 (96+60)	89	Excellent	91	Excellent
	96	29+44 (96+60)	29+82 (97+85)	93	Excellent		
	97	29+82 (97+85)	30+21 (99+10)	90	Excellent		
	99	30+21 (99+10)	30+59 (100+35)	93	Excellent		
Parallel Taxiway							
T1A	1	0+00 (0+00)	0+30 (1+00)	61	Good	58	Good
	2	0+30 (1+00)	0+61 (2+00)	64	Good		
	3	0+61 (2+00)	0+31 (3+00)	55	Fair		
	5	1+22 (4+00)	1+52 (5+00)	57	Good		
	6	1+52 (5+00)	1+83 (6+00)	54	Fair		
T2A	12	3+35 (11+00)	3+73 (12+25)	75	Very good	76	Very good
	13	3+73 (12+25)	4+11 (13+50)	85	Very good		
	14	4+11 (13+50)	4+50 (14+75)	85	Very good		
	16	4+50 (14+75)	4+88 (16+00)	74	Excellent		
	20	5+79 (19+00)	6+17 (20+25)	71	Very good		
	22	6+17 (20+25)	6+71 (22+00)	71	Very good		
T3A	23	6+71 (22+00)	7+01 (23+00)	52	Fair	59	Good
	24	7+01 (23+00)	7+32 (24+00)	64	Good		
	28	8+23 (27+00)	8+53 (28+00)	61	Good		
	31	9+14 (30+00)	9+45 (31+00)	61	Good		
	33	9+75 (32+00)	10+06 (33+00)	64	Good		
	36	10+67 (35+00)	10+97 (36+00)	64	Good		
	39	11+58 (38+00)	11+89 (39+00)	60	Good		
	45	13+41 (44+00)	13+72 (45+00)	53	Fair		
	50	14+94 (49+00)	15+24 (50+00)	64	Good		
	52	15+54 (51+00)	15+85 (52+00)	55	Fair		
	59	17+68 (58+00)	17+98 (59+00)	64	Good		
	67	20+12 (66+00)	20+42 (67+00)	64	Good		
	73	21+95 (72+00)	22+25 (73+00)	47	Fair		
	78	23+47 (77+00)	23+77 (78+00)	64	Good		
	82	24+69 (81+00)	24+99 (82+00)	60	Good		
T4A	85	25+60 (84+00)	25+91 (85+00)	64	Good	64	Good
	86	25+91 (85+00)	26+21 (86+00)	64	Good		
	87	26+21 (86+00)	26+52 (87+00)	64	Good		
	88	26+52 (87+00)	26+82 (88+00)	64	Good		
	89	26+82 (88+00)	27+13 (89+00)	64	Good		
T5A	92	27+74 (91+00)	28+04 (92+00)	35	Poor	44	Fair
	93	28+04 (92+00)	28+35 (93+00)	26	Poor		
	94	28+35 (93+00)	28+65 (94+00)	41	Fair		
	96	28+96 (95+00)	29+26 (96+00)	38	Poor		
	98	29+57 (97+00)	29+87 (98+00)	49	Fair		
	102	30+78 (101+00)	31+09 (102+00)	53	Fair		
	104	31+39 (103+00)	31+70 (104+00)	65	Good		
	109	32+92 (108+00)	33+22 (109+00)	51	Fair		
Taxiway 3 West							
T6C	1	0+00 (0+00)	0+30 (1+00)	64	Good	63	Good
	2	0+30 (1+00)	0+61 (2+00)	64	Good		
	3	0+61 (2+00)	0+91 (3+00)	64	Good		
	4	0+91 (3+00)	1+22 (4+00)	63	Good		
Taxiway 2 West							
T7C	1	0+00 (0+00)	0+30 (1+00)	64	Good	67	Good
	2	0+30 (1+00)	0+61 (2+00)	64	Good		
	3	0+61 (2+00)	0+91 (3+00)	69	Good		
	4	0+91 (3+00)	1+22 (4+00)	69	Good		
	5	1+22 (4+00)	1+52 (5+00)	69	Good		

(Sheet 2 of 6)

Table C1 (Continued)

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
Taxiway 3 East							
T8B	1	0+00 (0+00)	0+30 (1+00)	64	Good	62	Good
	2	0+30 (1+00)	0+61 (2+00)	64	Good		
	3	0+61 (2+00)	0+91 (3+00)	59	Good		
	4	0+91 (3+00)	1+22 (4+00)	59	Good		
	5	1+22 (4+00)	1+52 (5+00)	65	Good		
Taxiway 1 East							
T9B	1	0+00 (0+00)	0+30 (1+00)	64	Good	63	Good
	2	0+30 (1+00)	0+61 (2+00)	63	Good		
	3	0+61 (2+00)	0+91 (3+00)	64	Good		
	4	0+91 (3+00)	1+22 (4+00)	64	Good		
	5	1+22 (4+00)	1+52 (5+00)	61	Good		
Taxiway 2 East							
T10B	1	0+00 (0+00)	0+30 (1+00)	69	Good	65	Good
	2	0+30 (1+00)	0+61 (2+00)	65	Good		
	3	0+61 (2+00)	0+91 (3+00)	59	Good		
	4	0+91 (3+00)	1+22 (4+00)	65	Good		
	5	1+22 (4+00)	1+52 (5+00)	70	Good		
East Parallel Taxiway							
T11B Sec 1	5	1+22 (4+00)	1+52 (5+00)	64	Good	64	Good
	6	1+52 (5+00)	1+83 (6+00)	64	Good		
	7	1+83 (6+00)	2+13 (7+00)	64	Good		
	10	2+74 (9+00)	3+05 (10+00)	64	Good		
	14	3+96 (13+00)	4+27 (14+00)	64	Good		
	16	4+57 (15+00)	4+88 (16+00)	64	Good		
	21	6+10 (20+00	6+40 (21+00)	64	Good		
T11B Sec 2	1	0+30 (0+00)	0+30 (1+00)	53	Fair	59	Good
	2	0+30 (1+00)	0+61 (2+00)	56	Good		
	3	0+61 (2+00)	0+91 (3+00)	62	Good		
	4	0+91 (3+00)	1+22 (4+00)	66	Good		
East Ramp Taxiway							
T12B	1	0+00 (0+00)	0+30 (1+00)	48	Fair	53	Fair
	2	0+30 (1+00)	0+61 (2+00)	53	Fair		
	3	0+61 (2+00)	0+91 (3+00)	62	Good		
	4	0+91 (3+00)	1+22 (4+00)	51	Good		
T13B	1	0+00 (0+00)	0+30 (1+00)	64	Good	60	Good
	2	0+30 (1+00)	0+61 (2+00)	60	Good		
	3	0+61 (2+00)	0+91 (3+00)	59	Good		
	4	0+91 (3+00)	1+22 (4+00)	59	Good		
T14B	1	0+00 (0+00)	0+30 (1+00)	47	Fair	56	Good
	2	0+30 (1+00)	0+61 (2+00)	59	Good		
	3	0+61 (2+00)	0+91 (3+00)	59	Good		
	4	0+91 (3+00)	1+22 (4+00)	60	Good		
T15B Sec 1	1	0+00 (0+00)	0+30 (1+00)	57	Good	60	Good
	2	0+30 (1+00)	0+61 (2+00)	60	Good		
	3	0+61 (2+00)	0+91 (3+00)	64	Good		
	4	0+91 (3+00)	1+22 (4+00)	59	Good		
T15B Sec 2	2	--	--	48	Fair	56	Good
	5	--	--	52	Fair		
	6	--	--	64	Good		
	7	--	--	53	Fair		
	9	--	--	64	Good		

(Sheet 3 of 6)

Table C1 (Continued)

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
East Ramp Taxiway (Continued)							
T16B	9	2+44 (8+00)	2+74 (9+00)	64	Good	61	Good
	10	2+74 (9+00)	3+05(10+00)	70	Good		
	12	3+35 (11+00)	3+66 (12+00)	66	Good		
	14	3+96 (13+00)	4+27 (14+00)	54	Fair		
	17	4+88 (16+00)	5+18 (17+00)	55	Fair		
	18	5+18 (17+00)	5+49(18+00)	62	Good		
East Ramp Hoverlane							
T17B	2	0+30 (1+00)	0+61 (2+00)	64	Good	61	Good
	4	0+91 (3+00)	1+22 (4+00)	59	Good		
	5	1+22 (4+00)	1+52 (5+00)	64	Good		
	8	2+13(7+00)	2+44 (8+00)	61	Good		
	10	2+74 (9+00)	3+05(10+00)	61	Good		
T18B	1	0+00	0+30 (1+00)	65	Good	65	Good
	3	0+61 (2+00)	0+91 (3+00)	65	Good		
	5	1+22 (4+00)	1+52 (5+00)	65	Good		
	8	2+13(7+00)	2+44 (8+00)	61	Good		
	10	2+74 (9+00)	3+05(10+00)	73	Very good		
T19B	1	0+00	0+30 (1+00)	63	Good	62	Good
	3	0+61 (2+00)	0+91 (3+00)	59	Good		
	4	0+91 (3+00)	1+22 (4+00)	64	Good		
	6	1+52 (5+00)	1+83 (6+00)	65	Good		
	8	2+13(7+00)	2+44 (8+00)	64	Good		
	11	3+05(10+00)	3+35 (11+00)	62	Good		
Warm-up Aprons							
A2B	1	--	--	16	Very poor	17	Very poor
	2	--	--	19	Very poor		
	3	--	--	18	Very poor		
A3B	3	--	--	83	Very good	79	Very good
	4	--	--	79	Very good		
	5	--	--	93	Excellent		
	7	--	--	83	Very good		
	8	--	--	85	Very good		
	9	--	--	51	Fair		
North Ramp							
A4B Sec 1	1	--	--	71	Very good	79	Very good
	3	--	--	89	Excellent		
	7	--	--	88	Excellent		
	11	--	--	76	Very good		
	15	--	--	88	Excellent		
	17	--	--	82	Very good		
	19	--	--	88	Excellent		
	21	--	--	84	Very good		
	24	--	--	84	Very good		
	30	--	--	73	Very good		
	34	--	--	79	Very good		
	39	--	--	63	Good		
	42	--	--	81	Very good		
	45	--	--	70	Good		
A4B Sec 2	1	--	--	78	Very good	65	Good
	3	--	--	44	Fair		
	4	--	--	43	Fair		
	6	--	--	73	Very good		
	9	--	--	90	Excellent		
	11	--	--	47	Fair		
	12	--	--	80	Very good		
	16	--	--	79	Very good		
	17	--	--	52	Fair		

(Sheet 4 of 6)

Table C1 (Continued)

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
South Ramp							
A5B	2	--	--	11	Very poor	25	Very poor
	6	--	--	41	Fair		
	10	--	--	21	Very poor		
	12	--	--	37	Poor		
	17	--	--	29	Poor		
	19	--	--	62	Good		
	27	--	--	47	Fair		
	29	--	--	18	Very poor		
	35	--	--	21	Very poor		
	38	--	--	11	Very poor		
	46	--	--	23	Very poor		
	52	--	--	19	Very poor		
	60	--	--	32	Poor		
	63	--	--	41	Fair		
	69	--	--	19	Very poor		
	78	--	--	19	Very poor		
	82	--	--	40	Poor		
	89	--	--	10	Failed		
	93	--	--	28	Poor		
	96	--	--	43	Fair		
	98	--	--	42	Fair		
	101	--	--	31	Poor		
	103	--	--	46	Fair		
A6B	1	--	--	49	Fair	30	Poor
	3	--	--	51	Fair		
	5	--	--	11	Very poor		
	8	--	--	28	Poor		
	11	--	--	43	Fair		
	13	--	--	44	Fair		
	15	--	--	36	Poor		
	17	--	--	37	Poor		
	19	--	--	59	Good		
	21	--	--	21	Very poor		
	23	--	--	19	Very poor		
	25	--	--	28	Poor		
	27	--	--	13	Very poor		
	28	--	--	28	Poor		
	33	--	--	21	Very poor		
	35	--	--	29	Poor		
	38	--	--	43	Fair		
	42	--	--	21	Very poor		
	44	--	--	10	Failed		
	52	--	--	43	Fair		
East Ramp							
A7B	26	--	--	84	Very good	80	Very good
	29	--	--	89	Excellent		
	32	--	--	94	Excellent		
	39	--	--	89	Excellent		
	42	--	--	47	Fair		
	46	--	--	76	Very good		
	51	--	--	67	Good		
	57	--	--	82	Very good		
	63	--	--	92	Excellent		
	66	--	--	62	Good		
	68	--	--	76	Very good		
	79	--	--	79	Very good		
	83	--	--	85	Very good		
	86	--	--	82	Very good		
	94	---	--	92	Excellent		

(Sheet 5 of 6)

Table C1 (Concluded)

Feature	Sample Unit	Station m (ft) From	Station m (ft) To	PCI	Rating	Overall PCI	Overall Rating
East Ramp (Continued)							
A7B	100	--	--	95	Excellent		
	104	--	--	75	Very good		
	107	--	--	91	Excellent		
	113	--	--	65	Good		
	118	--	--	89	Excellent		
	121	--	--	81	Very good		
	134	--	--	80	Very good		
	137	--	--	78	Very good		
	140	--	--	53	Fair		
	142	--	--	84	Very good		
	148	--	--	80	Very good		
	154	--	--	93	Excellent		
	159	--	--	75	Very good		
	174	--	--	87	Excellent		
	193	--	--	92	Excellent		
A8B	3	--	--	90	Excellent	83	Very good
	8	--	--	98	Excellent		
	12	--	--	89	Excellent		
	17	--	--	84	Very good		
	28	--	--	78	Very good		
	32	--	--	83	Very good		
	36	--	--	85	Very good		
	38	--	--	79	Very good		
	43	--	--	57	Good		
	46	--	--	91	Excellent		
	48	--	--	85	Very good		
	50	--	--	89	Excellent		
	54	--	--	89	Excellent		
	56	--	--	90	Excellent		
	59	--	--	61	Good		
	62	--	--	87	Excellent		
	65	--	--	89	Excellent		
	68	--	--	67	Good		
	74	--	--	70	Good		
	78	--	--	86	Excellent		
	83	--	--	88	Excellent		
	86	--	--	85	Very good		
	89	--	--	83	Very good		
	92	--	--	83	Very good		
	95	--	--	76	Very good		
	97	--	--	90	Excellent		
	103	--	--	72	Very good		
	106	--	--	74	Very good		
	109	--	--	96	Excellent		
	114	--	--	98	Excellent		

(Sheet 6 of 6)

Table C2
Comparison of 1995, 1993 and 1988 PCI Surveys

Feature	1995 PCI	1995 Rating	1993 PCI	1993 Rating	Change in PCI (+ or -) 1993-1995	1988 PCI	1988 Rating	Change in PCI (+ or -) 1988-1993	Pavement Type
R1A	20	Very poor	51	Fair	-31	78	Very good	-27	AC
R2C	31	Poor	71	Very good	-40	75	Very good	-4	AC
R3C	45	Fair	62	Good	-17	78	Very good	-16	AC
R4C	28	Poor	55	Fair	-27	82	Very good	-27	AC
R5C	26	Poor	62	Good	-36	76	Very good	-14	AC
R6C	34	Poor	56	Good	-22	65	Good	-9	AC
R7A	83	Very good	98	Excellent	-15	97	Excellent	+1	PCC
R8A	91	Excellent	98	Excellent	-7	98	Excellent	0	PCC
T1A	58	Good	68	Good	-10	81	Very good	-13	AC
T2A	76	Very good	86	Excellent	-10	90	Excellent	-4	PCC
T3A	59	Good	68	Good	-9	84	Very good	-16	AC
T4A	64	Good	72	Very good	-8	82	Very good	-10	AC
T5A	44	Fair	65	Good	-11	83	Very good	-18	AC
T6C	63	Good	72	Very good	-9	83	Very good	-11	AC
T7C	67	Good	72	Very good	-5	79	Very good	-7	AC
T8B	62	Good	72	Very good	-10	76	Very good	-4	AC
T9B	63	Good	73	Very good	-10	79	Very good	-6	AC
T10B	65	Good	72	Very good	-7	100	Excellent	-28	AC
T11B, Sec 1	64	Good	73	Very good	-9	100	Excellent	-27	AC
T11B, Sec 2	59	Good	73	Very good	-14	100	Excellent	-27	AC
T12B	53	Fair	71	Very good	-18	100	Excellent	-29	AC
T13B	60	Good	69	Good	-9	100	Excellent	-31	AC
T14B	56	Good	73	Very good	-17	100	Excellent	-27	AC
T15B, Sec 1	60	Good	71	Very good	-11	100	Excellent	-29	AC
T15B, Sec 2	56	Good	72	Very good	-12	100	Excellent	-28	AC
T16B	61	Good	72	Very good	-11	100	Excellent	-28	AC
T17B	61	Good	72	Very good	-11	100	Excellent	-28	AC
T18B	65	Good	72	Very good	-7	100	Excellent	-28	AC
T19B	62	Good	72	Very good	-10	100	Excellent	-28	AC
A2B	17	Very poor	46	Fair	-29	45	Fair	+1	AC
A3B	79	Very good	90	Excellent	-11	97	Excellent	-7	PCC
A4B, Sec 1	79	Very good	84	Very good	-6	90	Excellent	-6	PCC
A4B, Sec 2	65	Good	76	Very good	-11	78	Very good	-2	PCC
A5B	25	Very poor	50	Fair	-25	63	Good	-13	AC
A6B	30	Fair	50	Fair	-20	44	Fair	+6	AC
A7B	80	Excellent	89	Excellent	-9	92	Excellent	-3	PCC
A8B	83	Excellent	90	Excellent	-7	94	Excellent	-4	PCC

Photo C1. Close-up of slippage crack, Runway 15-33 (R1A)

Photo C2. Typical alligator cracking, Runway 15-33 (R1A)

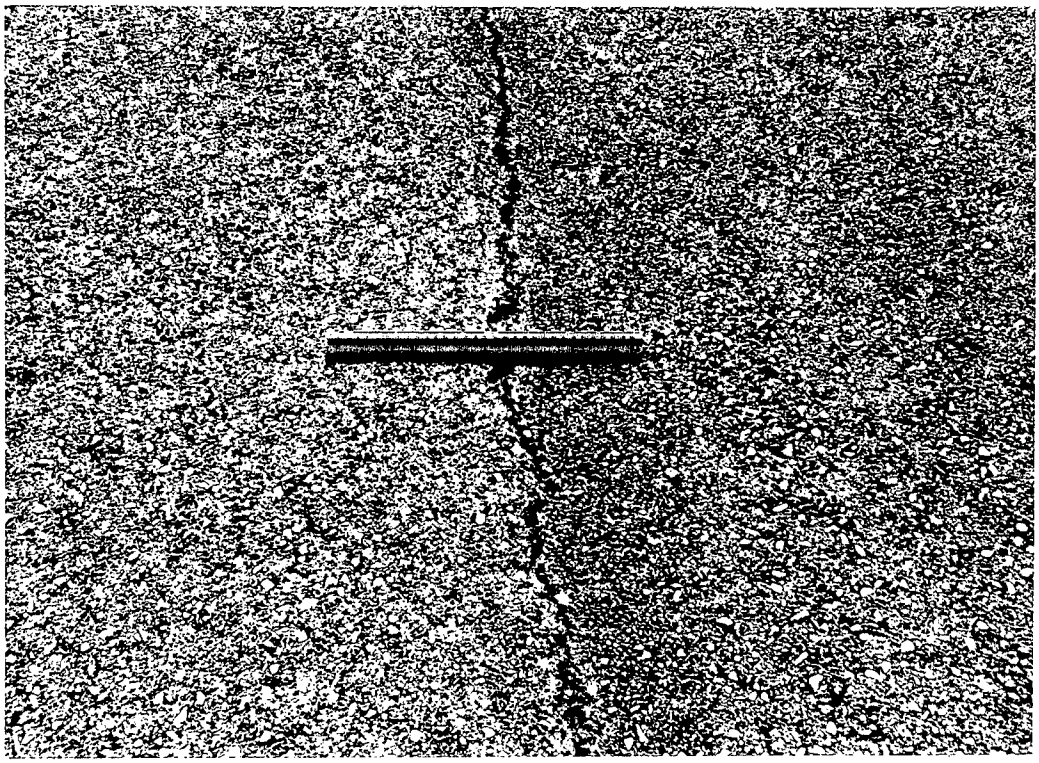

Photo C3. Typical longitudinal cracking, Runway 15-33 (R3C)

Photo C4. Overall view of PCC, Runway 15-33 (R7A)

Photo C5. Typical oil spillage, South Ramp (A5B)

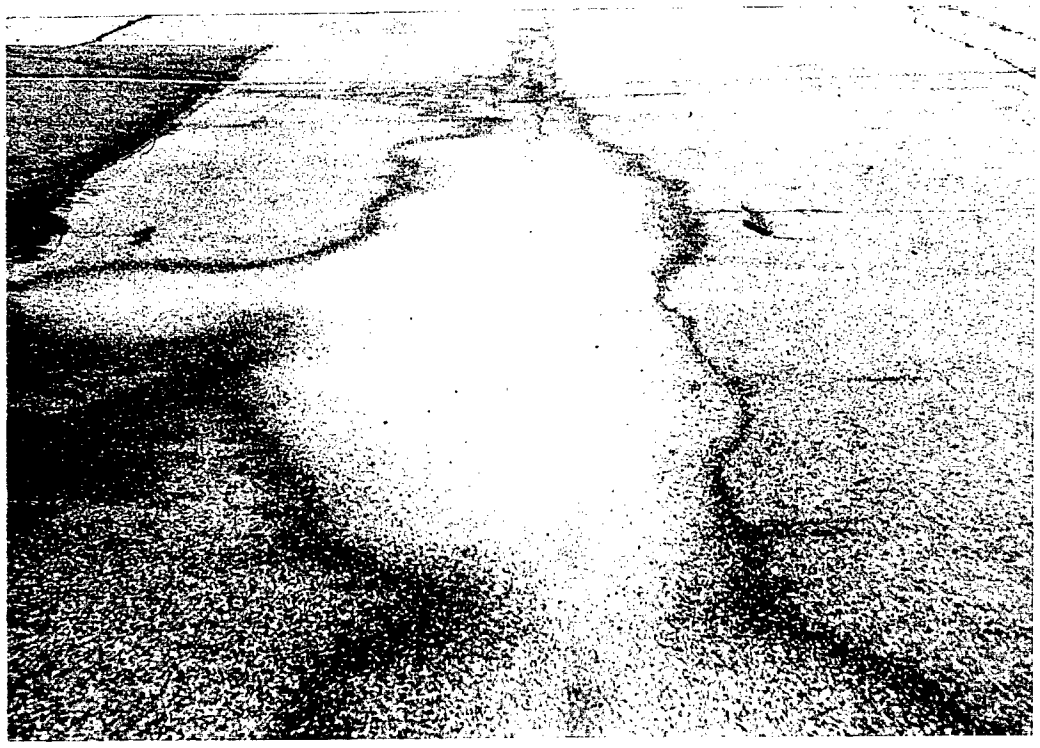

Photo C6. Medium-severity depression, South Ramp (A5B)

Photo C7. Block cracking, South Ramp (A6B)

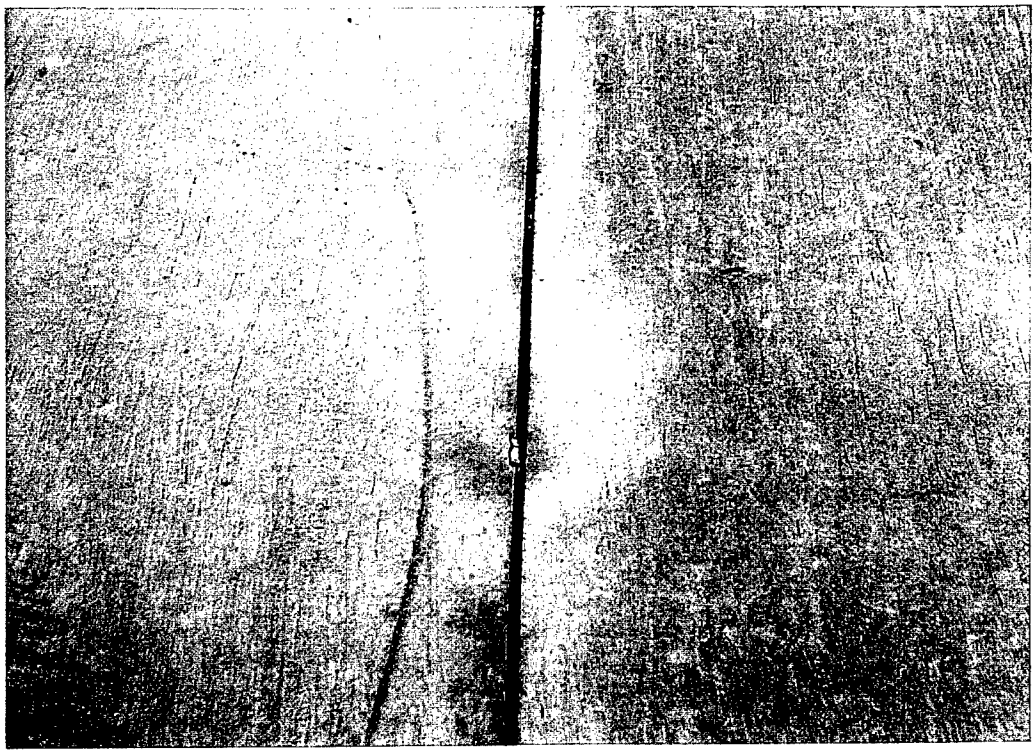

Photo C8. Pumping, East Ramp (A7B)

Appendix D
Structural Analysis

General

The projected performance of the airfield pavement facilities was analyzed for a 20-year analysis period. The traffic for this period was based on the information provided by the installation. These data (which are expected peace time traffic) are shown in Table A4.

The mixture of individual aircraft traffic listed in Table A4 was converted to equivalent traffic of the critical aircraft based on the procedure outlined in TM 5-825-2/DM 21.3/AFM 88-6, Chap 2 (Headquarters, Departments of the Army, the Navy, and the Air Force 1978). The critical aircraft is defined as that aircraft within a mixture of various aircraft operating at a facility which will impose a more severe combination of gear load and tire pressure than the other assigned aircraft based on the gross loads, tire pressure, type of landing gear, and number of repetitions of each of the assigned aircraft. The critical aircraft procedure will, for any projected aircraft traffic mixture, determine the critical aircraft within the mixture and compute the number of passes of the critical aircraft required to produce an equivalent effect on the pavement as the total mixture of traffic. The current Corps of Engineer design criteria is utilized to analyze and equate the various aircraft loadings. PCC and AC pavements have different design criteria and, thus, a different number of equivalent operations of the design aircraft. The critical aircraft operating on the PCC and AC fixed-wing pavements was determined to be the B-747. On the rotary-wing pavements the AH-64 aircraft was determined to be the critical aircraft. Table D1 presents the critical aircraft computation results for the fixed- and rotary-wing pavements, respectively.

The operational ACN was determined based on the critical aircraft; the 379 Mg (833-kip) B-747 aircraft on PCC and AC fixed-wing pavements, respectively; and the 7.8 Mg (17.4-kip) AH-64 aircraft on the rotary-wing pavements. The results showing the ACN values for each pavement type and subgrade strength are shown in Table D2.

During wartime, many aircraft are allowed to carry heavier loads than during peacetime. These heavier loads means that the aircraft would have a

higher ACN because of the higher loading and would cause more damage than in peacetime. This damage would reduce the life of the pavement. A mobilization ACN can be determined from the appropriate ACN-PCN curve presented in the ETL 1110-3-394 (Headquarters, Department of the Army 1991b). B-747 ACN-PCN curves are shown in Figure D1. During contingency planning, there is often the need to determine the largest possible aircraft that can safely land on the airfield. Generally the length of the runway controls the type of aircraft which can land on the airfield. Minimum take-off distances for maximum take-off weights of aircraft are also given in ETL 1110-3-394. Once the aircraft is known, the ACN of that aircraft can be determined from the ACN-PCN curve and then the effect of the higher loads on the airfield can be determined from the ACN/PCN ratio and pavement life utilized or passes until failure curves. Specific aircraft mobilization traffic requirements are contained in classified mobilization plans and are not included in this report.

ACN-PCN Method of Reporting Pavement Condition

The ACN-PCN method is used to provide a means of reporting the structural evaluation of a pavement and is a standardized International Civil Aviation Organization (ICAO) method. The ACN is used to express the effect of individual aircraft on different pavements by a single unique number which varies according to pavement type and subgrade strength without specifying a particular pavement thickness. Conversely, the PCN of a pavement can be expressed by a single unique number without specifying a particular aircraft. The ACN and PCN values are defined as follows:

a. ACN is a number which expresses the relative structural effect of an aircraft on different pavement types for specified standard subgrade strengths in terms of a standard single-wheel load.

b. PCN is a number which expresses the relative load-carrying capacity of a pavement for a given pavement life in terms of a standard single-wheel load.

The ACN-PCN method is structured so that the structural evaluation of a pavement for a particular aircraft can be accomplished by using the ratio of the aircraft ACN to the pavement PCN. For a given pavement life and a given number of operations for a particular aircraft there is a relationship between the ACN/PCN ratio and the percent of pavement life used by the applied traffic. For a given ACN/PCN ratio a relationship exists for the number of operations that will produce failure of the pavement. These relationships provide a method for evaluating a pavement for allowable load depending on acceptable degree of damage to the pavement or an allowable number of operations of a particular aircraft to cause failure of a pavement. For aircraft having an ACN equal to the PCN, the predicted failure of the

pavement would equal the design life of the pavement. Aircraft having ACN's higher than the pavement PCN would overload the pavement and decrease the life of the pavement. Likewise if the ACN of the operational aircraft is less than the pavement PCN, the life of the pavement would be greater than the design life. If the operational ACN is greater than the pavement PCN and a decrease in pavement life is not acceptable, then an overlay of the pavement is required to bring the pavement PCN up to or greater than the operational ACN.

PCN Analysis

Modulus values were input into the computer program to compute the load-carrying capacity of the pavements (PCN) and the overlay thickness requirements. The PCN for each pavement feature was determined in accordance with TM 5-826-1/AFJMAN 32-1036/DM 21.7 (Headquarters, Departments of the Army, the Air Force, and the Navy Draft). Using the design aircraft and traffic levels for normal operations, the PCN was determined for each pavement feature. The PCN is determined using the allowable gross aircraft load and the subgrade strength category determined from the CBR and k-values obtained through correlations with backcalculated subgrade modulus values. Typical ACN-PCN curves are shown in Figures D1 and D2. Table D3 presents a summary of the evaluation of each pavement feature in terms of allowable gross aircraft loadings, PCN, and overlays required to bring the PCN up to the required PCN (ACN of the design aircraft). The APEC presented in Figure 2-1 shows a layout of the airfield pavements and corresponding PCN for each facility.

An analysis was completed to determine additional strengthening requirements to increase the PCN to equal the current ACN. This increase is based on the traffic presented in Table D1. Although the increase in strength is presented as overlay thickness, several other approaches could be used to increase the strength. A detailed analysis will be required to select and design the most cost-effective repair or improvement alternative. It should be noted that although less than 10.2 cm (4-in.)-thick AC and 15.2 cm (6-in.)-thick PCC overlay requirements are indicated in Table D3, the following minimum thicknesses are recommended in TM 5-825-3/AFM 88-6, Chap. 3 (Headquarters, Departments of the Army and the Air Force 1988):

a. 51 mm (2-in.)-thick minimum AC overlay over AC pavements.

b. 102 mm (4-in.)-thick minimum AC overlay over PCC pavements.

c. 152 mm (6-in.)-thick minimum PCC partially or nonbonded overlay.

d. 51 mm (2-in.)-thick minimum PCC fully bonded overlay over PCC pavements.

These minimum overlay requirements are required to control the degree of cracking which will occur in the base pavement (existing pavement) due to the application of the design traffic. If those features needing structural improvements do not receive the required strengthening, the rate of deterioration can be quite rapid leading to damage in all pavement layers. Damage in the pavement layers will generally cause dramatic increases in the cost of later treatments after failure has occurred. Damage may also cause the pavement to be closed for operation for a considerable period of time.

The PCN codes for the weakest feature within each pavement facility during normal operations are shown in Table D4. The PCN codes include the PCN numerical value, pavement type, subgrade category, allowable tire pressure, and method used to determine the PCN. An example of a PCN code is: 30/F/A/X/T, with 30 expressing the numerical PCN value, F indicating a flexible pavement, A indicating high strength subgrade, X indicating medium-allowable tire pressure, and T indicating that the PCN value was obtained by a technical evaluation. Table D5 presents a description of all the letter codes comprising the PCN code. Each PCN assumes that only the design aircraft will be used for the stated number of passes. Once the PCN's were determined, relationships were developed for pavement life and allowable traffic as a function of the ratio of ACN to PCN. Theoretically, if the PCN is equal to the ACN, the pavement should perform with only routine maintenance through the length of the analysis period. There may be situations when operators have to overload a pavement, i.e., the ACN is greater than the PCN. Pavements can usually support some overload; however, pavement life is reduced. If the PCN equals the ACN, the ratio of the ACN to the PCN (ACN/PCN) equals 1, and the pavement is expected to perform satisfactorily until the end of the analysis period. If the PCN is less than the ACN, ACN/PCN would be greater than 1.0, and the pavement would be expected to fail before reaching the end of the analysis period. Thus if the ACN for mobilization or the ACN for contingency planning divided by the current PCN is 1.5, failure would be expected to occur at about 175 applications for fixed-wing aircraft on rigid pavements, based on Figure D3. Figures D3 and D4 show the relationships for the allowable passes to failure if the ACN/PCN is known. Figures D5 and D6 show the relationships for pavement life utilized in percent if the ACN/PCN is know. Another example of how the ACN/PCN figures are used is shown.

Example Problem

A heavy cargo mission has been assigned to the fixed-wing facility. Aircraft traffic is projected to be 500 passes of a 156-Mg (345-kip) C-141.

a. Is Runway 15-33 long enough?

b. What is the ACN for the aircraft?

c. Will the runway be overloaded?

d. If Runway 15-33 is overloaded, how much of the pavement life will be utilized during this mission?

Solution

From Table D3, the controlling feature on Runway 15-33 is R7A. Feature R7A has a PCN code of 56/R/C/W/T.

a. From ETL 1110-3-394 the minimum take-off distance at maximum take-off weight wartime is 1798 m (5,900 ft). Therefore, Runway 15-33 has the required length for this aircraft.

b. From ETL 1110-3-394 the ACN of a 156-Mg (345-kip) C-141 on a rigid pavement over a low strength subgrade is 63/R/C/W/T.

c. The ACN/PCN is 63/56 or 1.125. Therefore, the runway pavement will be overloaded.

d. From Figure D5, the percent life utilized for an ACN/PCN of 1.125 and 500 passes is about 20 percent.

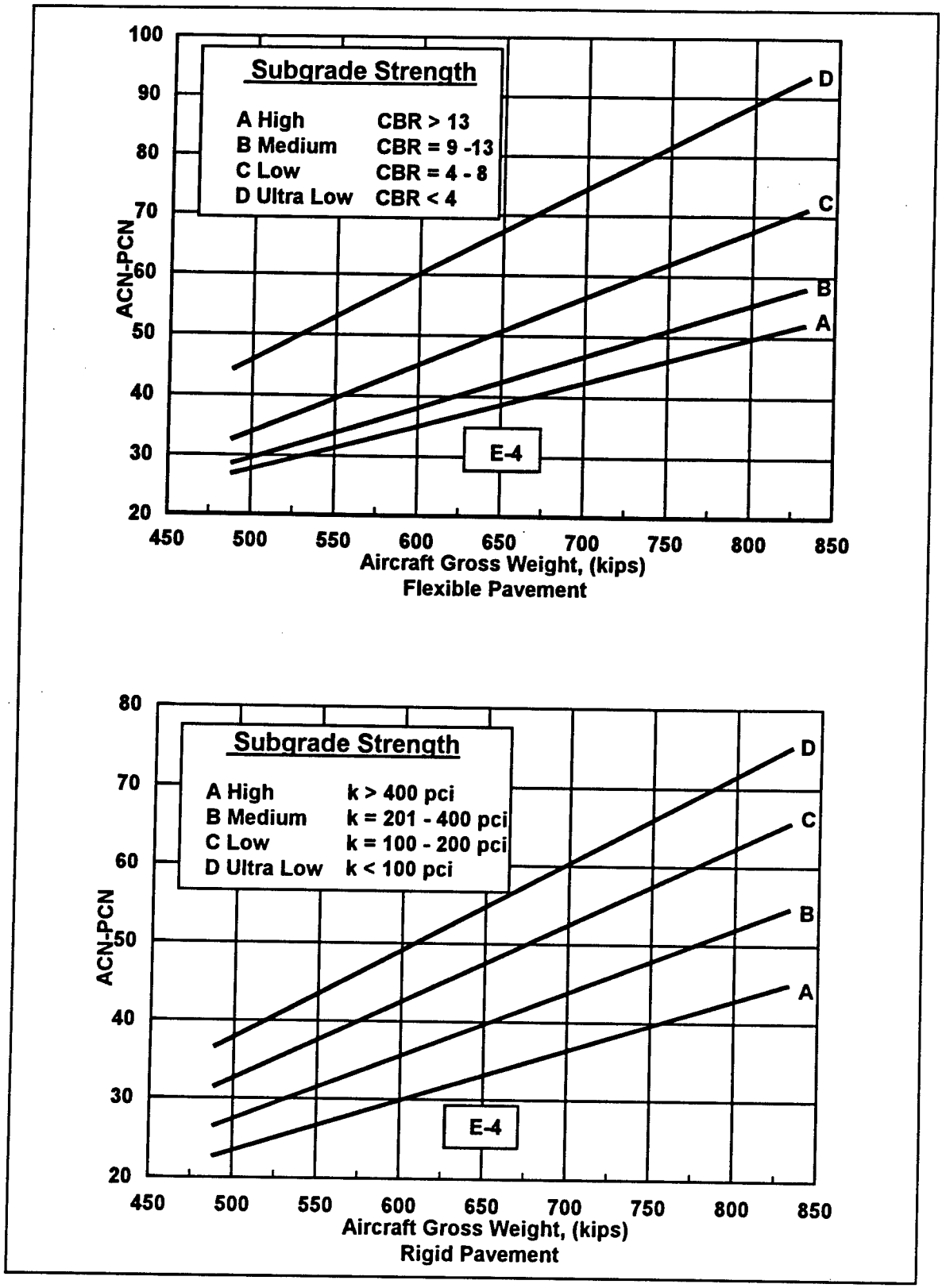

Figure D1. ACN-PCN curves for B-747/E4 aircraft

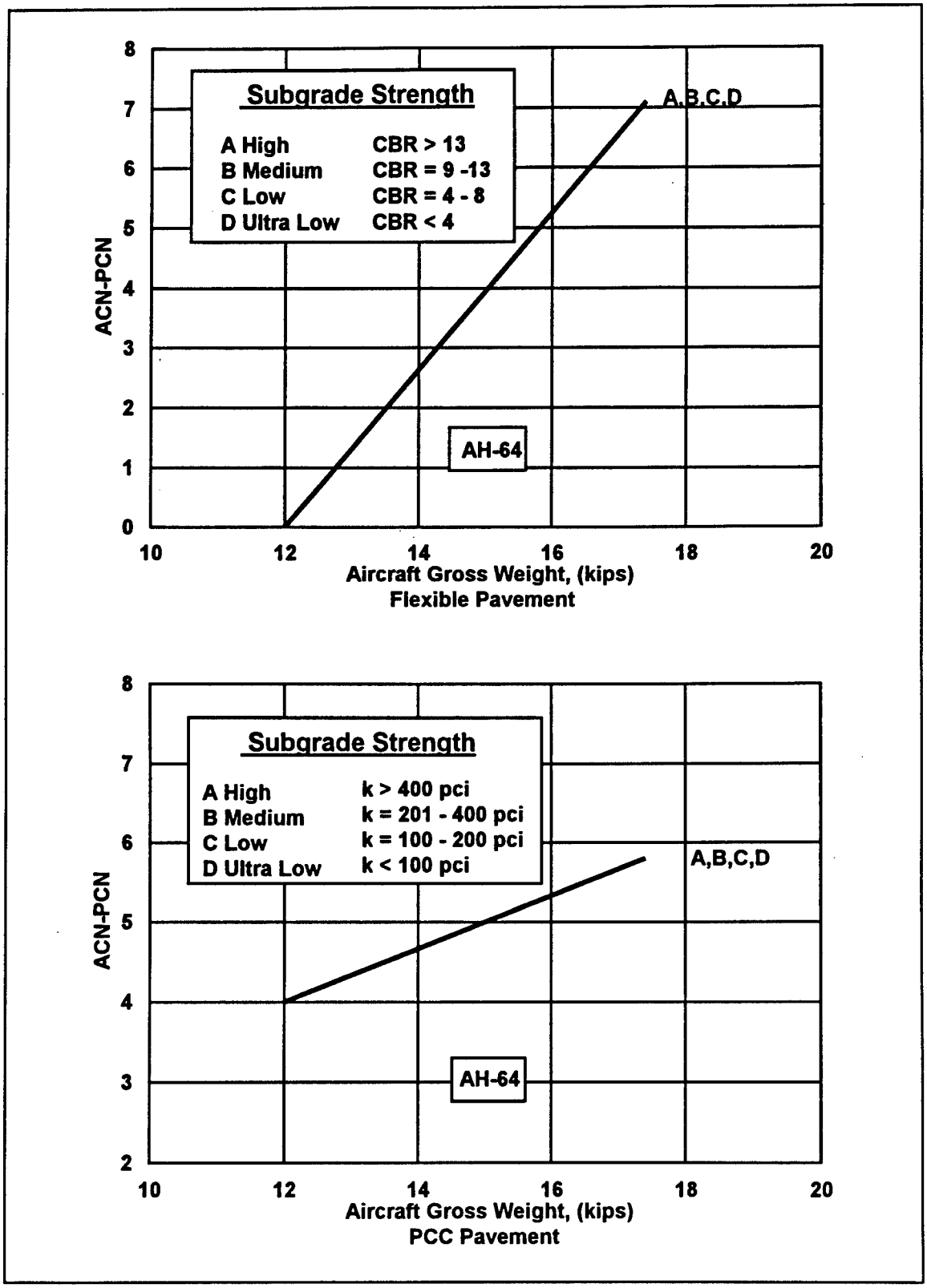

Figure D2. ACN-PCN curves for the AH-64 aircraft

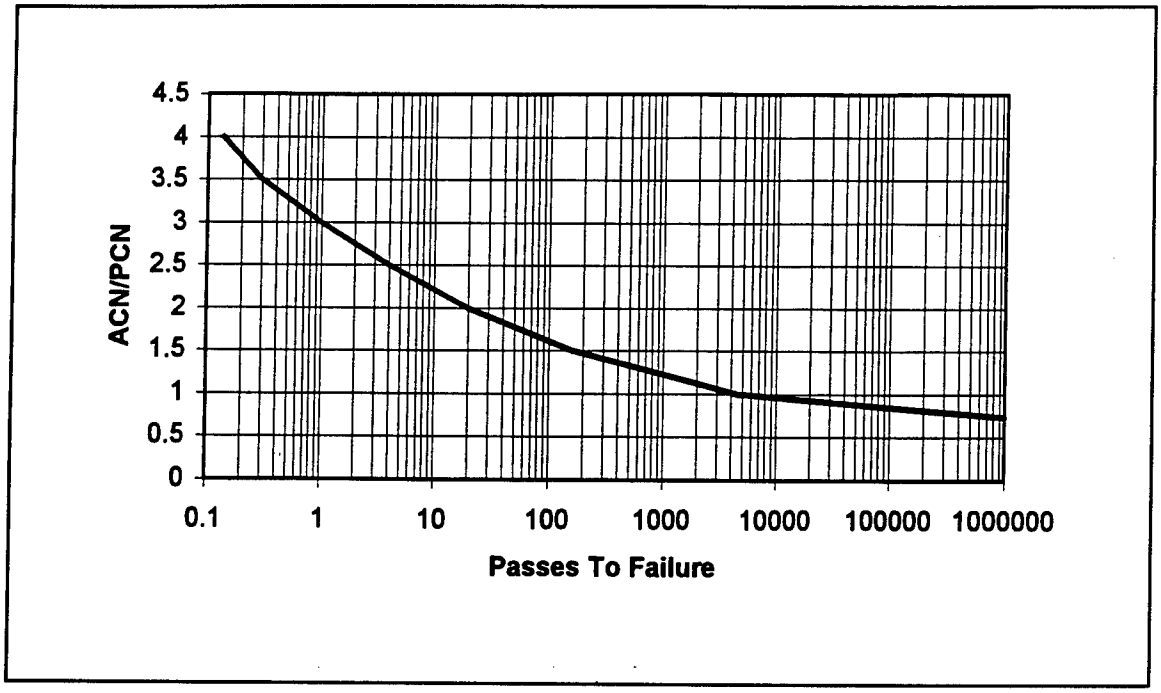

Figure D3. Passes until failure (fixed-wing rigid)

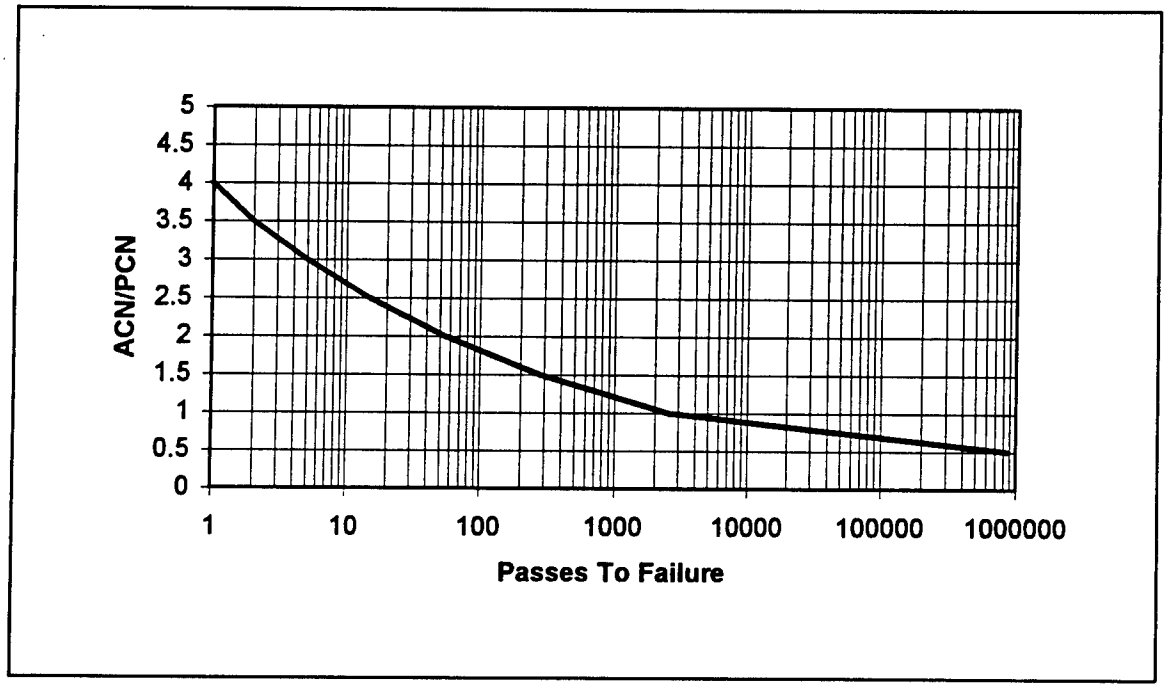

Figure D4. Passes until failure (fixed-wing flexible)

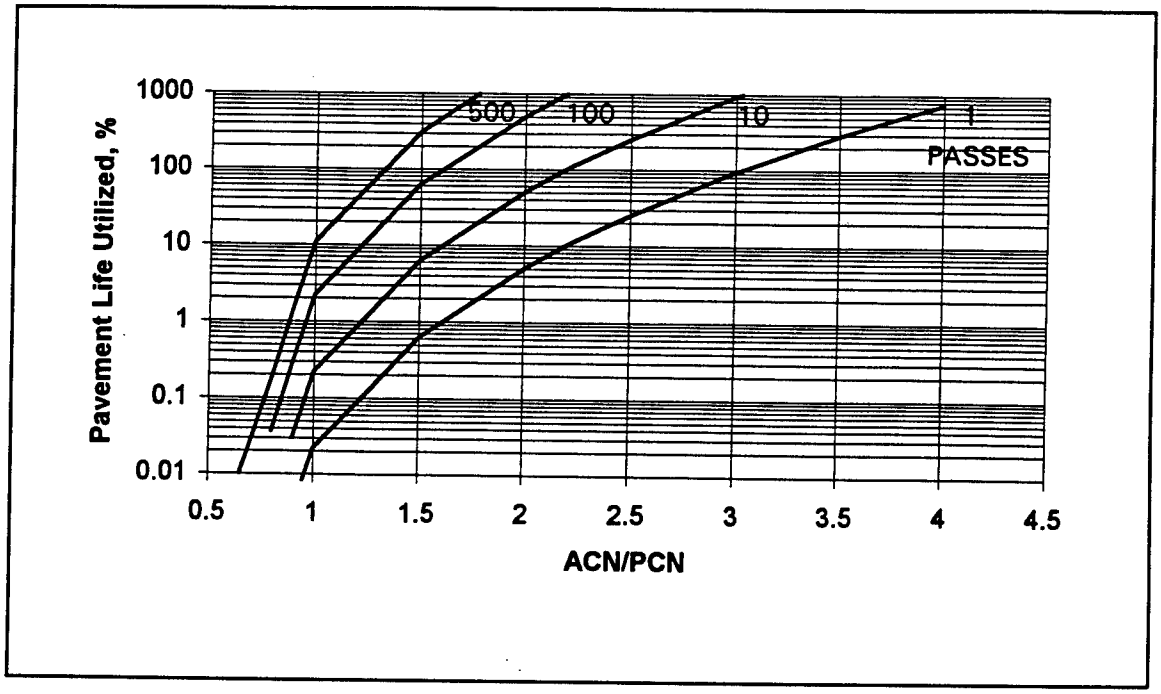

Figure D5. Pavement life utilized (fixed-wing rigid)

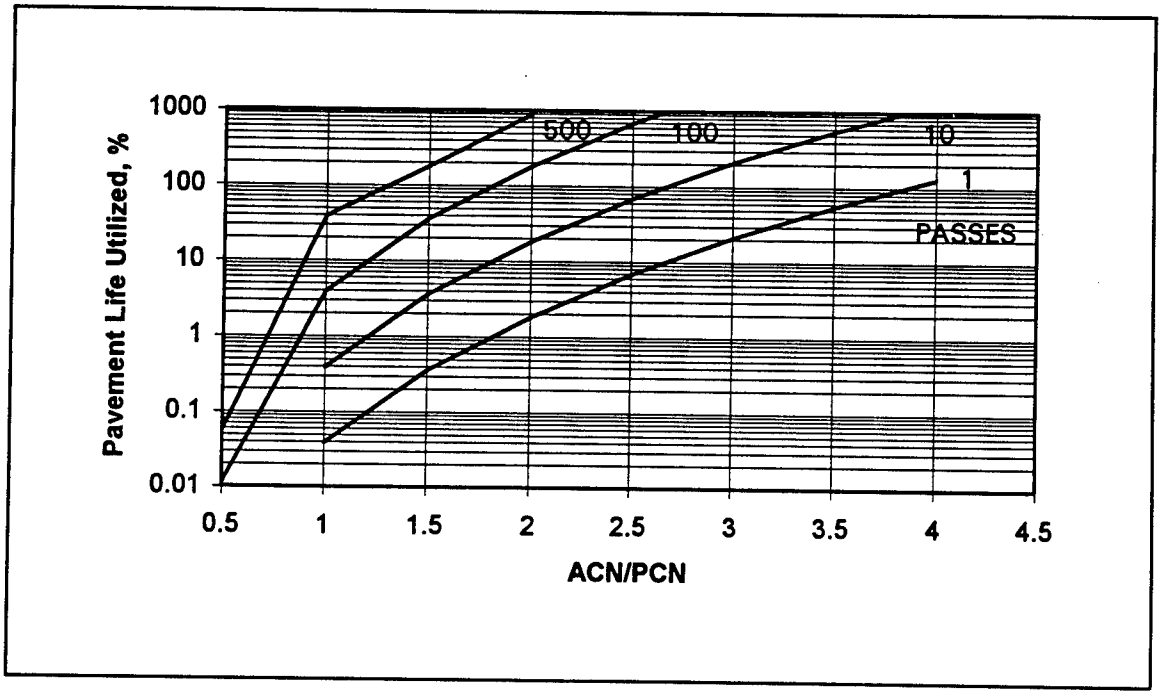

Figure D6. Pavement life utilized (fixed-wing flexible)

Table D1
Determination of Critical Aircraft and Design Traffic Level

Fixed-Wing Aircraft	Gross Weight kg (lb)	20-year Projected Aircraft Passes	20-year Equivalent B-747 Passes
AC Fixed-Wing Pavements			
A-10	22,680 (50,000)	1,211	1
AB-300	165,149 (363,765)	33	10
B-727	72,576 (160,000)	382	68
B-737	61,236 (135,000)	622	3
B-747	377,849 (833,000)	1,582	1,582
B-757	108,864 (240,000)	65	1
C-5A	381,022 (840,000)	2,542	22
C-17	263,320 (580,000)	55	40
C-141	147,418 (325,000)	1,298	241
C-130	68,100 (150,000)	2,018	4
C-20	31,644 (69,700)	131	1
C-9	48,988 (108,000)	1,091	2
CH-47	21,338 (47,000)	1,484	1
DC-8	161,170 (355,000)	55	14
F-16	15,740 (34,700)	284	1
KC-10	267,620 (590,000)	829	495
KC-135	146,059 (322,000)	229	23
L-1011	195,048 (430,000)	393	9
MD-11	276,940 (610,000)	65	52
P-3	63,451 (17,400)	33	1
Miscellaneous	7,258 (20,000)	3,836	0
20 year Total Equivalent B-747 Passes @ 377,849 (833,000) = 2,571 Use 2,600			
PCC Fixed-Wing Pavements			
Fixed-Wing Aircraft	Gross Weight kg (lb)	20-year Projected Aircraft Passes	20-year Equivalent B-747 Passes
A-10	22,680 (50,000)	1,211	0
AB-300	165,149 (363,765)	33	22
B-727	72,576 (160,000)	382	1,582
B-737	61,236 (135,000)	622	61
B-747	377,849 (833,000)	1,582	1,582
B-757	108,864 (240,000)	65	1
C-5A	381,022 (840,000)	2,542	276
C-17	263,320 (580,000)	55	17
C-141	147,418 (325,000)	1,298	564
C-130	68,100 (150,000)	2,018	1
C-20	31,644 (69,700)	131	1
C-9	48,988 (108,000)	1,091	8
CH-47	21,338 (47,000)	1,484	0
DC-8	161,170 (355,000)	55	27

(Continued)

Table D1 (Concluded)

Rotary-Wing Aircraft	Weight kg (lb)	20-year Projected Aircraft Passes	20-year Equivalent B-747 Passes
PCC Fixed-Wing Pavements(Continued)			
F-16	15,740 (34,700)	284	0
KC-10	267,620 (590,000)	829	585
KC-135	146,059 (322,000)	229	40
L-1011	195,048 (430,000)	393	5
MD-11	276,940 (610,000)	65	66
P-3	63,451 (17,400)	33	11
Miscellaneous	7,258 (20,000)	3,836	0
20 year Total Equivalent B-747 Passes @ 377,849 (833,000) = 4,849 Use 4,900			
Rotary-Wing Aircraft	**Weight kg (lb)**	**20-year Projected Aircraft Passes**	**20-year Equivalent AH-64 Passes**
PCC Rotary-Wing Pavements			
AH-64	7,893 (17,400)	17,600	17,600
20 year Total Equivalent AH-64 passes @ 7,893(17,400) = 17,600 Use 17,600			
AC Rotary-Wing Pavements			
AH-64	7,893 (17,400)	17,600	17,600
20 year Total Equivalent AH-64 passes @ 7,893 (17,400) = 17,600 Use 17,600			

Table D2
Determination of ACN Values for Critical Aircraft

Design Fixed-Wing Aircraft	Weight kg (lb)	Subgrade Category[1]	ACN or Required PCN
PCC Pavements			
B-747	377,849 (833,000)	A B C D	45 54 65 75
AC Pavements			
B-747	377,849 (833,000)	A B C D	52 58 71 93
Design Rotary-Wing Aircraft	**Weight kg (lb)**	**Subgrade Category[1]**	**ACN or Required PCN**
PCC Pavements			
AH-64	7,893 (17,400)	A, B, C and D	6
AC Pavements			
AH-64	7,893 (17,400)	A, B, C and D	6

[1] See Table D-4 for subgrade category.

Table D3
Allowable Gross Aircraft Loads and Overlay Requirements for Design Aircraft Traffic[1]

Pavement Facility	Feature	Test Number or Station m (ft)	Type Traffic Area	Calculated Subgrade CBR Percent[2]	Operational ACN[3]	Allowable Gross Load Mg (kips)	PCN	Theoretical Overlay Requirements, mm (in.)		
								AC	PCC	PCC with Bond Breaker
Runway 15-33	R1A	0+00-3+05 (0+00-10+00)	A	17	52/F/A/W/T	378 (833)[4]	89/F/A/W/T	0(0.0)	--	--
Runway 15-33	R2C	3+05-4+27 (10+00-14+00)	C	17	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Runway 15-33	R3C	4+27-15+24 (14+00-50+00)	C	19	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Runway 15-33	R4C	15+24-21+03 (50+00-69+00)	C	22	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Runway 15-33	R5C	21+03-25+60 (69+00-84+00)	C	12	58/F/B/W/T	378 (833)[4]	94/F/B/W/T	0(0.0)	--	--
Runway 15-33	R6C	25+60-27+43 (84+00-90+00)	C	15	52/F/A/W/T	378 (833)[4]	101/F/A/W/T	0(0.0)	--	--
Runway 15-33	R7A	27+43-28+96 (90+00-95+00)	A	k=50 (k=183)	65/R/C/W/T	334 (736)	56/R/C/W/T	0(0.0)	84(3.3)	155(6.1)
Runway 15-33	R8A	28+96-30+48 (95+00-100+00)	A	k=50 (k=186)	65/R/C/W/T	378 (833)[4]	71/R/C/W/T	0(0.0)	0(0.0)	0(0.0)
Parallel Taxiway	T1A	0+00-2+71 (0+00-8+90)	A	29	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Parallel Taxiway	T2A	2+71-6+68 (8+90-21+90)	A	k=92 (k=341)	54/R/B/W/T	378 (833)[4]	89/R/B/W/T	0(0.0)	0(0.0)	0(0.0)
Parallel Taxiway	T3A	6+68-25+60 (21+90-84+00)	A	18	52/F/A/W/T	378 (833)[4]	81/F/A/W/T	0(0.0)	--	--

[1] The day-to-day traffic is equivalent to 2,600 passes of a 378,825 kg (833,000 lb) B-747 for flexible fixed-wing pavements, and 4,900 passes of a 378,825 kg (833,000 lb) B-747 for rigid fixed-wing pavements. The day-to-day traffic is equivalent to 17,600 passes of a 7,892 kg (17,400 lb) AH-64 for rotary-wing pavements.
[2] CBR and k value were calculated using the backcalculated subgrade modulus. k values are in MN/m^3 (PSI/in.) units.
[3] Determined for the critical.aircraft.
[4] The allowable load is greater than the design aircraft load.

(Sheet 1 of 3)

Table D3 (Continued)

Pavement Facility	Feature	Test Number or Station m (ft)	Type Traffic Area	Calculated Subgrade CBR Percent[2]	Operational ACN[3]	Allowable Gross Load Mg (kips)	PCN	Theoretical Overlay Requirements, mm (in.)		
								AC	PCC	PCC with Bond Breaker
Parallel Taxiway	T4A	25+60-27+43 (84+00-90+00)	A	21	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Parallel Taxiway	T5A	27+4333+53 (90+00-110+00)	A	17	52/F/A/W/T	378 (833)[4]	64/F/A/W/T	0(0.0)	--	--
Taxiway 3 West	T6C	0+00-1+98 (0+00-6+50)	C	22	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Taxiway 2 West	T7C	0+00-1+98 (0+00-6+50)	C	24	52/F/A/W/T	378 (833)[4]	110/F/A/W/T	0(0.0)	--	--
Taxiway 3 East	T8B	0+00-2+59 (0+00-08+50)	B	10	58/F/B/W/T	235 (518)	31/F/B/W/T	168(6.6)	--	--
Taxiway 1 East	T9B	0+00-1+98 (0+00-6+49)	B	11	6/F/B/W/T	7.9 (17.4)[4]	21/F/B/W/T	0(0.0)	--	--
Taxiway 2 East	T10B	0+00-2+44 (0+00-8+00)	B	28	6/F/A/W/T	7.9 (17.4)[4]	57/F/A/W/T	0(0.0)	--	--
East Parallel Taxiway	T11B Sect 1	1+31-8+31 (4+30-27+25)	B	21	6/F/A/W/T	7.9 (17.4)[4]	29/F/A/W/T	0(0.0)	--	--
East Parallel Taxiway	T11B Sect 2	0+00-1+31 (0+00-4+30)	B	15	6/F/A/W/T	7.9 (17.4)[4]	13/F/A/W/T	0(0.0)	--	--
East Ramp Taxiway	T12B	0+00-2+44 (0+00-8+00)	B	21	6/F/A/W/T	7.9 (17.4)[4]	20/F/A/W/T	0(0.0)	--	--
East Ramp Taxiway	T13B	0+00-1+22 (0+00-4+00)	B	13	6/F/B/W/T	7.9 (17.4)[4]	14/F/B/W/T	0(0.0)	--	--
East Ramp Taxiway	T14B	0+00-1+22 (0+00-4+00)	B	15	6/F/A/W/T	7.9 (17.4)[4]	14/F/A/W/T	0(0.0)	--	--
East Ramp Taxiway	T15B Sect 1	0+00-1+83 (0+00-6+00)	B	23	6/F/A/W/T	7.9 (17.4)[4]	21/F/A/W/T	0(0.0)	--	--
East Ramp Taxiway	T15B Sect 2	0 to 11	B	20	6/F/A/W/T	7.9 (17.4)[4]	13/F/A/W/T	0(0.0)	--	--

(Sheet 2 of 3)

Table D3 (Concluded)

Pavement Facility	Feature	Test Number or Station m (ft)	Type Traffic Area	Calculated Subgrade CBR Percent[2]	Operational ACN[3]	Allowable Gross Load Mg (kips)	PCN	Theoretical Overlay Requirements, mm (in.)		
								AC	PCC	PCC with Bond Breaker
East Ramp Taxiway	T16B	2+43-5+84 (8+00-19+15)	B	12	6/F/B/W/T	7.9 (17.4)[4]	20/F/B/W/T	0(0.0)	--	--
East Ramp Hoverlane	T17B	0+00-3+37 (0+00-11+06)	B	6	6/F/C/W/T	7.9 (17.4)[4]	11/F/C/W/T	0(0.0)	--	--
East Ramp Hoverlane	T18B	0+00-3+37 (0+00-11+06)	B	15	6/F/A/W/T	7.9 (17.4)[4]	25/F/A/W/T	0(0.0)	--	--
East Ramp Hoverlane	T19B	0+00-3+37 (0+00-11+06)	B	15	6/F/A/W/T	7.9 (17.4)[4]	25/F/A/W/T	0(0.0)	--	--
East Warm-up Apron	A2B	1 to 3	B	7	6/F/C/W/T	7.9 (17.4)[4]	13/F/C/W/T	0(0.0)	--	--
West Warm-up Apron	A3B	1 to 5	B	k=70 (k=258)	54/R/B/W/T	378 (833)[4]	70/R/B/W/T	0(0.0)	0(0.0)	0(0.0)
North Ramp	A4B Sect 1	1 to 39	B	k=66 (k=243)	54/R/B/W/T	378 (833)[4]	59/R/B/W/T	0(0.0)	0(0.0)	0(0.0)
North Ramp	A4B Sect 2	1 to 8	B	k=67 (k=248)	65/R/C/W/T	378 (833)[4]	67/R/C/W/T	0(0.0)	0(0.0)	0(0.0)
South Ramp	A5B	1 to 21	B	16	52/F/A/W/T	266 (587)	34/F/A/W/T	127(5.0)	--	--
South Ramp	A6B	1 to 9	B	27	52/F/A/W/T	372 (803)	51/F/A/W/T	5(0.2)	--	--
East Ramp	A7B	1 to 40	B	k=38 (k=139)	6/R/C/W/T	7.9 (17.4)[4]	9/R/C/W/T	0(0.0)	0(0.0)	0(0.0)
East Ramp	A8B	1 to 39	B	k=39 (k=143)	6/R/C/W/T	7.9 (17.4)[4]	8/R/C/W/T	0(0.0)	0(0.0)	0(0.0)

(Sheet 3 of 3)

Table D4
Summary of Pavement Classification Numbers

Pavement Facility	Controlling Feature	PCN[1]
Runway 15-33		
Ends	R7A	56/R/C/W/T
Interior	R3C	94/F/B/W/T
Parallel Taxiway	T5A	64/F/B/W/T
Taxiway 3 West	T6C	110/F/A/W/T
Taxiway 2 West	T7C	110/F/A/W/T
Taxiway 3 East	T8B	31/F/B/W/T
Taxiway 1 East	T9B	21/F/A/W/T
Taxiway 2 East	T10B	57/F/A/W/T
East Parallel Taxiway	T11B	13/F/A/W/T
East Ramp Taxiways	T13B	14/F/B/W/T
East Ramp Hoverlane	T17B	11/F/C/W/T
East Warm-up Apron	A2B	13/F/C/W/T
West Warm-up Apron	A3B	70/R/B/W/T
North Ramp	A4B, Sec 1	59/R/B/W/T
	A4B, Sec 2	67/R/C/W/T
South Ramp	A5B	34/F/A/W/T
East Ramp	A8B	8/R/C/W/T

[1] Table D5 describes the components of the PCN Code.

Table D5
PCN Five-Part Code

PCN	Pavement Type	Subgrade Strength[1]	Tire Pressure[2]	Method of PCN Determination
Numerical value	R - rigid	A	W	T - technical evaluation
	F - flexible	B	X	U - using aircraft
		C	Y	
		D	Z	

[1]

Code	Category	Flexible Pavement CBR, percent	Rigid Pavement k, kPa/cm (PSI/in.)
A	High	Over 13	Over 108 (400)
B	Medium	8 - 13	55-108 (201-400)
C	Low	4 - 8	27-55 (100-200)
D	Ultralow	< 4	< 27 (100)

[2]

Code	Category	Tire Pressure, kPa (psi)
W	High	No limit
X	Medium	1.0-1.5 (146-217)
Y	Low	0.5-1.0 (74-145)
Z	Ultralow	0-0.5 (0-73)

Appendix E
Micro PAVER Output Summary

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 1000.00 LF
Branch Number - R1A Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 199998.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 20 RATING = V. POOR

TOTAL NUMBER OF SAMPLE UNITS = 10
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 3
RECOMMENDED MINIMUM OF 9 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 11.7%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	9777.30 (SF)	4.89	35.9
41 ALLIGATOR CR	MEDIUM	10932.89 (SF)	5.47	48.3
43 BLOCK CR	LOW	4883.95 (SF)	2.44	10.7
48 L & T CR	LOW	3324.77 (LF)	1.66	6.5
48 L & T CR	MEDIUM	1850.38 (LF)	.93	10.9
48 L & T CR	HIGH	259.00 (LF)	.13	8.6
50 PATCHING	LOW	16279.82 (SF)	8.14	13.0
52 WEATH/RAVEL	LOW	162998.40 (SF)	81.50	24.5
55 SLIPPAGE CR	N/A	19638.21 (SF)	9.82	50.3

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 40.39 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 35.53 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 24.08 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 400.00 LF
Branch Number - R2C Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 80000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 31 RATING = POOR

TOTAL NUMBER OF SAMPLE UNITS = 4
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 9.9%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	376.00 (SF)	.47	14.0
41 ALLIGATOR CR	MEDIUM	5992.00 (SF)	7.49	52.4
43 BLOCK CR	LOW	8976.00 (SF)	11.22	17.6
48 L & T CR	LOW	2380.00 (LF)	2.98	10.0
48 L & T CR	MEDIUM	648.00 (LF)	.81	10.2
52 WEATH/RAVEL	LOW	80000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 50.83 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 49.17 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 3600.00 LF
Branch Number - R3C Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 720000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 45 RATING = FAIR

TOTAL NUMBER OF SAMPLE UNITS = 36
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 15
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 3
RECOMMENDED MINIMUM OF 18 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 13.5%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	7487.80 (SF)	1.04	20.8
41 ALLIGATOR CR	MEDIUM	12052.00 (SF)	1.67	34.4
43 BLOCK CR	LOW	15735.60 (SF)	2.19	10.3
43 BLOCK CR	MEDIUM	4230.00 (SF)	.59	10.4
48 L & T CR	LOW	26908.20 (LF)	3.74	11.9
48 L & T CR	MEDIUM	15704.80 (LF)	2.18	16.4
48 L & T CR	HIGH	1381.80 (LF)	.19	10.1
49 OIL SPILLAGE	N/A	2.00 (SF)	.00	2.0
52 WEATH/RAVEL	LOW	718750.00 (SF)	99.83	26.3
52 WEATH/RAVEL	MEDIUM	1250.00 (SF)	.17	4.5
53 RUTTING	LOW	5329.80 (SF)	.74	14.1
53 RUTTING	MEDIUM	376.00 (SF)	.05	13.0

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 47.27 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 51.58 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 1.15 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 1900.00 LF
Branch Number - R4C Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 379998.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 28 RATING = POOR

TOTAL NUMBER OF SAMPLE UNITS = 19
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 7
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 7 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 6.5%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	5808.54 (SF)	1.53	24.5
41 ALLIGATOR CR	MEDIUM	3691.41 (SF)	.97	28.9
42 BLEEDING	N/A	65.14 (SF)	.02	.0
43 BLOCK CR	LOW	2171.42 (SF)	.57	6.5
43 BLOCK CR	MEDIUM	33385.54 (SF)	8.79	22.5
43 BLOCK CR	HIGH	325.71 (SF)	.09	9.9
48 L & T CR	LOW	9717.09 (LF)	2.56	8.9
48 L & T CR	MEDIUM	11182.80 (LF)	2.94	19.3
48 L & T CR	HIGH	1074.85 (LF)	.28	11.6
52 WEATH/RAVEL	LOW	248084.40 (SF)	65.29	22.5
52 WEATH/RAVEL	MEDIUM	122142.20 (SF)	32.14	34.8
52 WEATH/RAVEL	HIGH	9771.38 (SF)	2.57	30.2
53 RUTTING	LOW	3039.98 (SF)	.80	14.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 28.98 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 71.02 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 1500.00 LF
Branch Number - R5C Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 299997.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 26 RATING = POOR

TOTAL NUMBER OF SAMPLE UNITS = 15
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 6
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 4.8%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	7449.93 (SF)	2.48	29.2
41 ALLIGATOR CR	MEDIUM	9149.91 (SF)	3.05	41.2
43 BLOCK CR	LOW	14999.85 (SF)	5.00	13.6
43 BLOCK CR	MEDIUM	21249.79 (SF)	7.08	21.0
48 L & T CR	LOW	3279.97 (LF)	1.09	5.1
48 L & T CR	MEDIUM	15969.84 (LF)	5.32	26.6
48 L & T CR	HIGH	6429.94 (LF)	2.14	28.1
52 WEATH/RAVEL	LOW	299997.00 (SF)	100.00	26.4
53 RUTTING	LOW	3399.97 (SF)	1.13	15.9

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 41.67 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 58.33 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - RUNWAY 15-33 Section Length - 600.00 LF
Branch Number - R6C Section Width - 200.00 LF
Section Number - 1 Family - DEFAULT Section Area - 119997.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 34 RATING = POOR

TOTAL NUMBER OF SAMPLE UNITS = 6
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 20.1%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	MEDIUM	3383.92 (SF)	2.82	40.3
43 BLOCK CR	LOW	2399.94 (SF)	2.00	10.0
43 BLOCK CR	MEDIUM	34319.14 (SF)	28.60	33.4
48 L & T CR	LOW	547.19 (LF)	.46	4.0
48 L & T CR	MEDIUM	3916.70 (LF)	3.26	20.4
52 WEATH/RAVEL	LOW	95997.60 (SF)	80.00	24.3
52 WEATH/RAVEL	MEDIUM	17999.55 (SF)	15.00	24.8
52 WEATH/RAVEL	HIGH	5999.85 (SF)	5.00	41.2

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 20.30 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 79.70 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

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Network ID       - RGRAY
Branch Name      - RUNWAY 15-33                  Slab Length      -     25.00 LF
Branch Number    - R7A                           Slab Width       -     25.00 LF
Section Number   - 1        Family - DEFAULT     Number of Slabs  -       160
================================================================================

--------------------------------------------------------------------------------
Inspection Date: NOV/02/1995
Riding Quality :              Safety:       Drainage Cond.:
Shoulder Cond. :       Overall Cond.:              F.O.D.:
--------------------------------------------------------------------------------
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PCI OF SECTION =  83                                    RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS =    12
NUMBER OF RANDOM SAMPLE UNITS SURVEYED     =     4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED =     0
RECOMMENDED MINIMUM OF    10 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED =   9.6%


            *** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE     SEVERITY       QUANTITY       DENSITY %    DEDUCT VALUE
65 JT SEAL DMG    MEDIUM      80 (SLABS)          50.00            7.0
65 JT SEAL DMG    HIGH        80 (SLABS)          50.00           12.0
74 JOINT SPALL    LOW          2 (SLABS)           1.25            1.0
74 JOINT SPALL    MEDIUM       6 (SLABS)           3.75            3.6
74 JOINT SPALL    HIGH         4 (SLABS)           2.50            7.9
75 CORNER SPALL   LOW          2 (SLABS)           1.25             .5


         *** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD               RELATED DISTRESSES =    .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES =  59.16 PERCENT DEDUCT VALUES.
OTHER              RELATED DISTRESSES =  40.84 PERCENT DEDUCT VALUES.
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INSPECTION REPORT

Network ID	- RGRAY		
Branch Name	- RUNWAY 15-33	Slab Length	- 25.00 LF
Branch Number	- R8A	Slab Width	- 25.00 LF
Section Number	- 1 Family - DEFAULT	Number of Slabs	- 160

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 91 RATING = EXCELLENT

TOTAL NUMBER OF SAMPLE UNITS = 12
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
65 JT SEAL DMG	MEDIUM	160 (SLABS)	100.00	7.0
74 JOINT SPALL	LOW	4 (SLABS)	2.50	1.6
75 CORNER SPALL	LOW	2 (SLABS)	1.25	.5

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD	RELATED DISTRESSES =	.00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY	RELATED DISTRESSES =	76.44 PERCENT DEDUCT VALUES.
OTHER	RELATED DISTRESSES =	23.56 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - PARALLEL TAXIWAY
Branch Number - T1A
Section Number - 1 Family - DEFAULT
Section Length - 890.00 LF
Section Width - 75.00 LF
Section Area - 66744.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 58 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 10
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 4.1%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	85.43 (SF)	.13	7.2
43 BLOCK CR	LOW	1503.07 (SF)	2.25	10.4
48 L & T CR	LOW	4653.39 (LF)	6.97	18.6
48 L & T CR	MEDIUM	2157.17 (LF)	3.23	20.3
52 WEATH/RAVEL	LOW	66744.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 8.68 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 91.32 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - PARALLEL TAXIWAY
Branch Number - T2A
Section Number - 1 Family - DEFAULT
Slab Length - 25.00 LF
Slab Width - 25.00 LF
Number of Slabs - 156

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 76 RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS = 10
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 6
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 6 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 6.5%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
63 LINEAR CR	LOW	3 (SLABS)	2.08	2.2
65 JT SEAL DMG	MEDIUM	24 (SLABS)	15.63	7.0
65 JT SEAL DMG	HIGH	131 (SLABS)	84.38	12.0
66 SMALL PATCH	MEDIUM	3 (SLABS)	2.08	1.2
74 JOINT SPALL	LOW	1 (SLABS)	1.04	.7
74 JOINT SPALL	MEDIUM	4 (SLABS)	3.13	3.3
74 JOINT SPALL	HIGH	4 (SLABS)	3.13	9.5
75 CORNER SPALL	LOW	14 (SLABS)	9.38	3.5
75 CORNER SPALL	MEDIUM	3 (SLABS)	2.08	1.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 5.40 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 46.63 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 47.97 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - PARALLEL TAXIWAY
Branch Number - T3A
Section Number - 1 Family - DEFAULT
Section Length - 6210.00 LF
Section Width - 75.00 LF
Section Area - 465750.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 59 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 62
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 15
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 6 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 5.5%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	248.40 (SF)	.05	7.0
48 L & T CR	LOW	24790.32 (LF)	5.32	15.4
48 L & T CR	MEDIUM	18791.46 (LF)	4.03	22.9
52 WEATH/RAVEL	LOW	465750.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 9.76 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 90.24 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

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Network ID      - RGRAY
Branch Name     - PARALLEL TAXIWAY              Section Length  -    600.00 LF
Branch Number   - T4A                           Section Width   -     75.00 LF
Section Number  - 1       Family - DEFAULT      Section Area    -  45000.00 SF
================================================================================

  --------------------------------------------------------------------------
  Inspection Date: NOV/02/1995
  Riding Quality :             Safety:       Drainage Cond.:
  Shoulder Cond. :      Overall Cond.:              F.O.D.:
  --------------------------------------------------------------------------
  --------------------------------------------------------------------------

  PCI OF SECTION =  64                                RATING = GOOD

  TOTAL NUMBER OF SAMPLE UNITS =     6
  NUMBER OF RANDOM SAMPLE UNITS SURVEYED     =     5
  NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED =     0
  RECOMMENDED MINIMUM OF     5 RANDOM SAMPLE UNITS TO BE SURVEYED.
  STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED =    .0%


            *** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

  DISTRESS-TYPE    SEVERITY       QUANTITY         DENSITY %    DEDUCT VALUE
  48 L & T CR       LOW         1002.60 (LF)         2.23           8.0
  48 L & T CR       MEDIUM      1468.80 (LF)         3.26          20.4
  52 WEATH/RAVEL    LOW        45000.00 (SF)       100.00          26.4


         *** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

  LOAD               RELATED DISTRESSES =    .00 PERCENT DEDUCT VALUES.
  CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
  OTHER              RELATED DISTRESSES =    .00 PERCENT DEDUCT VALUES.
```

INSPECTION REPORT

Network ID - RGRAY
Branch Name - PARALLEL TAXIWAY
Branch Number - T5A
Section Number - 1 Family - DEFAULT
Section Length - 2000.00 LF
Section Width - 75.00 LF
Section Area - 150003.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 44 RATING = FAIR

TOTAL NUMBER OF SAMPLE UNITS = 12
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 8
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 9 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 12.2%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	555.01 (SF)	.37	12.2
41 ALLIGATOR CR	MEDIUM	1158.77 (SF)	.77	26.7
43 BLOCK CR	MEDIUM	468.76 (SF)	.31	8.9
48 L & T CR	LOW	8501.42 (LF)	5.67	16.2
48 L & T CR	MEDIUM	3573.82 (LF)	2.38	17.2
48 L & T CR	HIGH	1027.52 (LF)	.68	16.5
52 WEATH/RAVEL	LOW	135940.20 (SF)	90.63	25.4
52 WEATH/RAVEL	MEDIUM	11718.98 (SF)	7.81	18.5
53 RUTTING	MEDIUM	2343.80 (SF)	1.56	27.3

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 39.20 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 60.80 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

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Network ID      - RGRAY
Branch Name     - TAXIWAY 3 WEST                Section Length  -    650.00 LF
Branch Number   - T6C                           Section Width   -     75.00 LF
Section Number  - 1       Family - DEFAULT      Section Area    -  48744.00 SF
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  Inspection Date: NOV/02/1995
  Riding Quality :            Safety:       Drainage Cond.:
  Shoulder Cond. :      Overall Cond.:              F.O.D.:
  --------------------------------------------------------------------
  --------------------------------------------------------------------

  PCI OF SECTION =  63                                RATING = GOOD

  TOTAL NUMBER OF SAMPLE UNITS =     6
  NUMBER OF RANDOM SAMPLE UNITS SURVEYED     =     4
  NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED =     0
  RECOMMENDED MINIMUM OF     5 RANDOM SAMPLE UNITS TO BE SURVEYED.
  STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED =    .0%


            *** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

  DISTRESS-TYPE    SEVERITY        QUANTITY       DENSITY %    DEDUCT VALUE
  48 L & T CR       LOW         1318.53 (LF)        2.70           9.3
  48 L & T CR       MEDIUM      1537.87 (LF)        3.15          20.0
  52 WEATH/RAVEL    LOW        48744.00 (SF)      100.00          26.4


        *** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

  LOAD               RELATED DISTRESSES =    .00 PERCENT DEDUCT VALUES.
  CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
  OTHER              RELATED DISTRESSES =    .00 PERCENT DEDUCT VALUES.
```

INSPECTION REPORT

Network ID - RGRAY
Branch Name - TAXIWAY 2 EAST Section Length - 650.00 LF
Branch Number - T7C Section Width - 75.00 LF
Section Number - 1 Family - DEFAULT Section Area - 48744.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 67 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 6
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.6%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	1834.72 (LF)	3.76	12.0
48 L & T CR	MEDIUM	187.18 (LF)	.38	7.3
52 WEATH/RAVEL	LOW	48744.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - TAXIWAY 3 EAST
Branch Number - T8B
Section Number - 1 Family - DEFAULT
Section Length - 850.00 LF
Section Width - 75.00 LF
Section Area - 63747.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 62 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 8
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.8%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	392.68 (LF)	.62	4.2
48 L & T CR	MEDIUM	1657.42 (LF)	2.60	18.0
48 L & T CR	HIGH	232.04 (LF)	.36	12.7
52 WEATH/RAVEL	LOW	63747.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - TAXIWAY 1 EAST Section Length - 649.00 LF
Branch Number - T9B Section Width - 75.00 LF
Section Number - 1 Family - DEFAULT Section Area - 48672.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 63 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 6
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 1.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	471.14 (LF)	.97	4.9
48 L & T CR	MEDIUM	1271.31 (LF)	2.61	18.1
48 L & T CR	HIGH	107.08 (LF)	.22	10.6
52 WEATH/RAVEL	LOW	48672.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST RAMP TAXIWAY Section Length - 800.00 LF
Branch Number - T10B Section Width - 75.00 LF
Section Number - 1 Family - DEFAULT Section Area - 60000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 65 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 8
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 4.4%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	302.40 (LF)	.50	4.1
48 L & T CR	MEDIUM	770.40 (LF)	1.28	12.6
49 OIL SPILLAGE	N/A	302.40 (SF)	.50	3.1
52 WEATH/RAVEL	LOW	60000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 93.30 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 6.70 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST PARALLEL TAXIWAY
Branch Number - T11B
Section Number - 1 Family - DEFAULT
Section Length - 2295.00 LF
Section Width - 100.00 LF
Section Area - 229500.00 SF

Inspection Date: NOV/02/1995
Riding Quality :
Safety:
Drainage Cond.:
Shoulder Cond. :
Overall Cond.:
F.O.D.:

PCI OF SECTION = 64
RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 23
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 7
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = .0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	4104.77 (LF)	1.79	6.9
48 L & T CR	MEDIUM	5901.43 (LF)	2.57	17.9
52 WEATH/RAVEL	LOW	229500.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST PARALLEL TAXIWAY Section Length - 430.00 LF
Branch Number - T11B Section Width - 100.00 LF
Section Number - 2 Family - DEFAULT Section Area - 43000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 59 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 4
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 5.8%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	268.75 (LF)	.63	4.3
48 L & T CR	MEDIUM	1548.00 (LF)	3.60	21.5
48 L & T CR	HIGH	408.50 (LF)	.95	19.1
52 WEATH/RAVEL	LOW	43000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST RAMP TAXIWAY
Branch Number - T12B
Section Number - 1 Family - DEFAULT
Section Length - 600.00 LF
Section Width - 100.00 LF
Section Area - 60000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 53 RATING = FAIR

TOTAL NUMBER OF SAMPLE UNITS = 6
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 6.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	LOW	5437.50 (SF)	9.06	16.5
48 L & T CR	LOW	993.75 (LF)	1.66	6.5
48 L & T CR	MEDIUM	3600.00 (LF)	6.00	28.3
48 L & T CR	HIGH	150.00 (LF)	.25	11.1
52 WEATH/RAVEL	LOW	60000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST RAMP TAXIWAY
Branch Number - T13B
Section Number - 1 Family - DEFAULT
Section Length - 400.00 LF
Section Width - 50.00 LF
Section Area - 20000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 60 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 4
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.2%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	207.50 (LF)	1.04	5.0
48 L & T CR	MEDIUM	451.25 (LF)	2.26	16.7
48 L & T CR	HIGH	135.00 (LF)	.68	16.4
52 WEATH/RAVEL	LOW	20000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST APRON TAXIWAY
Branch Number - T14B
Section Number - 1 Family - DEFAULT
Section Length - 400.00 LF
Section Width - 50.00 LF
Section Area - 20000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 56 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 4
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 6.2%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	LOW	2431.25 (SF)	12.16	18.1
48 L & T CR	LOW	190.00 (LF)	.95	4.8
48 L & T CR	MEDIUM	787.50 (LF)	3.94	22.6
52 WEATH/RAVEL	LOW	20000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST APRON TAXIWAY
Branch Number - T15B
Section Number - 1 Family - DEFAULT
Section Length - 600.00 LF
Section Width - 50.00 LF
Section Area - 30000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 60 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 6
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 4
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.8%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	LOW	3843.75 (SF)	12.81	18.4
48 L & T CR	LOW	298.13 (LF)	.99	4.9
48 L & T CR	MEDIUM	573.75 (LF)	1.91	15.4
52 WEATH/RAVEL	LOW	30000.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST APRON TAXIWAY Section Length - 840.00 LF
Branch Number - T15B Section Width - 40.00 LF
Section Number - 2 Family - DEFAULT Section Area - 33600.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 56 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 9
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 6 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 7.3%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	LOW	5113.04 (SF)	15.22	19.5
48 L & T CR	LOW	642.78 (LF)	1.91	7.2
48 L & T CR	MEDIUM	1106.61 (LF)	3.29	20.5
48 L & T CR	HIGH	36.52 (LF)	.11	7.9
50 PATCHING	LOW	730.43 (SF)	2.17	5.9
52 WEATH/RAVEL	LOW	33600.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST APRON TAXIWAY
Branch Number - T16B
Section Number - 1 Family - DEFAULT
Section Length - 1115.00 LF
Section Width - 130.00 LF
Section Area - 109850.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 61 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 11
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 6
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 6 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 6.2%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	516.70 (LF)	.47	4.0
48 L & T CR	MEDIUM	3083.94 (LF)	2.81	18.8
50 PATCHING	LOW	3214.13 (SF)	2.93	7.1
50 PATCHING	MEDIUM	1301.93 (SF)	1.19	10.0
52 WEATH/RAVEL	LOW	105333.90 (SF)	95.89	26.0

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - HOVERLANE (WEST) Section Length - 976.00 LF
Branch Number - T17B Section Width - 130.00 LF
Section Number - 1 Family - DEFAULT Section Area - 126880.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 61 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 10
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
45 DEPRESSION	LOW	253.76 (SF)	.20	.8
48 L & T CR	LOW	3375.01 (LF)	2.66	9.2
48 L & T CR	MEDIUM	5328.96 (LF)	4.20	23.4
50 PATCHING	LOW	715.60 (SF)	.56	2.6
52 WEATH/RAVEL	LOW	101504.00 (SF)	80.00	24.3

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 98.70 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 1.30 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - HOVERLANE (CENTER) Section Length - 976.00 LF
Branch Number - T18B Section Width - 130.00 LF
Section Number - 1 Family - DEFAULT Section Area - 126880.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 65 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 10
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 5
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 4.4%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	5293.43 (LF)	4.17	12.9
48 L & T CR	MEDIUM	2040.23 (LF)	1.61	14.1
50 PATCHING	LOW	923.69 (SF)	.73	3.0
52 WEATH/RAVEL	LOW	101504.00 (SF)	80.00	24.3

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - HOVERLANE 3 Section Length - 1106.00 LF
Branch Number - T198 Section Width - 130.00 LF
Section Number - 1 Family - DEFAULT Section Area - 143780.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 62 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 11
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 6
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 5 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 2.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
48 L & T CR	LOW	230.05 (LF)	.16	2.8
48 L & T CR	MEDIUM	6939.78 (LF)	4.83	25.2
50 PATCHING	LOW	1159.83 (SF)	.81	3.1
52 WEATH/RAVEL	LOW	143780.00 (SF)	100.00	26.4

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST WARM-UP APRON
Branch Number - A2B
Section Number - 1 Family - DEFAULT
Section Length - 280.00 LF
Section Width - 190.00 LF
Section Area - 53199.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 17 RATING = V. POOR

TOTAL NUMBER OF SAMPLE UNITS = 3
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 3
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMEND EVERY SAMPLE UNIT BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 1.4%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	HIGH	23052.90 (SF)	43.33	62.9
50 PATCHING	LOW	127.68 (SF)	.24	2.0
52 WEATH/RAVEL	LOW	14186.40 (SF)	26.67	15.6
52 WEATH/RAVEL	HIGH	35466.00 (SF)	66.67	68.0

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 100.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - WEST WARM-UP APRON
Branch Number - A3B
Section Number - 1 Family - DEFAULT
Slab Length - 25.00 LF
Slab Width - 25.00 LF
Number of Slabs - 168

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 79 RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS = 9
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 6
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 8 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 14.5%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
62 CORNER BREAK	LOW	1 (SLABS)	.95	.7
63 LINEAR CR	LOW	1 (SLABS)	.95	1.0
65 JT SEAL DMG	LOW	24 (SLABS)	14.29	2.0
65 JT SEAL DMG	MEDIUM	64 (SLABS)	38.10	7.0
65 JT SEAL DMG	HIGH	80 (SLABS)	47.62	12.0
67 LARGE PATCH	LOW	1 (SLABS)	.95	.7
67 LARGE PATCH	MEDIUM	3 (SLABS)	1.90	5.6
69 PUMPING	N/A	3 (SLABS)	1.90	2.2
71 FAULTING	HIGH	3 (SLABS)	1.90	6.6
74 JOINT SPALL	LOW	1 (SLABS)	.95	.6
75 CORNER SPALL	HIGH	1 (SLABS)	.95	1.2

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 4.29 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 53.03 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 42.67 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - NORTH RAMP
Branch Number - A4B
Section Number - 1 Family - DEFAULT
Slab Length - 25.00 LF
Slab Width - 25.00 LF
Number of Slabs - 1002

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 79 RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS = 46
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 14
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 10 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 8.1%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
62 CORNER BREAK	LOW	3 (SLABS)	.36	.7
63 LINEAR CR	MEDIUM	10 (SLABS)	1.07	1.5
65 JT SEAL DMG	MEDIUM	143 (SLABS)	14.29	7.0
65 JT SEAL DMG	HIGH	787 (SLABS)	78.57	12.0
66 SMALL PATCH	LOW	10 (SLABS)	1.07	.2
66 SMALL PATCH	HIGH	3 (SLABS)	.36	2.0
67 LARGE PATCH	LOW	7 (SLABS)	.71	.7
67 LARGE PATCH	MEDIUM	3 (SLABS)	.36	2.5
69 PUMPING	N/A	14 (SLABS)	1.43	2.1
74 JOINT SPALL	LOW	14 (SLABS)	1.43	1.2
74 JOINT SPALL	MEDIUM	10 (SLABS)	1.07	1.3
74 JOINT SPALL	HIGH	14 (SLABS)	1.43	4.6
75 CORNER SPALL	LOW	7 (SLABS)	.71	.3
75 CORNER SPALL	MEDIUM	17 (SLABS)	1.79	1.2
75 CORNER SPALL	HIGH	3 (SLABS)	.36	1.2

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 5.73 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 49.36 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 44.90 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - NORTH RAMP
Branch Number - A4B
Section Number - 2 Family - DEFAULT
Slab Length - 20.00 LF
Slab Width - 20.00 LF
Number of Slabs - 250

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 65 RATING = GOOD

TOTAL NUMBER OF SAMPLE UNITS = 19
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 9
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 16 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 18.4%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
62 CORNER BREAK	LOW	1 (SLABS)	.56	.7
62 CORNER BREAK	MEDIUM	2 (SLABS)	1.11	1.5
63 LINEAR CR	LOW	2 (SLABS)	1.11	1.2
63 LINEAR CR	MEDIUM	6 (SLABS)	2.78	7.4
65 JT SEAL DMG	MEDIUM	250 (SLABS)	100.00	7.0
66 SMALL PATCH	LOW	8 (SLABS)	3.33	.4
66 SMALL PATCH	MEDIUM	1 (SLABS)	.56	.6
67 LARGE PATCH	LOW	6 (SLABS)	2.78	2.0
67 LARGE PATCH	MEDIUM	1 (SLABS)	.56	2.5
69 PUMPING	N/A	13 (SLABS)	5.56	5.5
71 FAULTING	LOW	1 (SLABS)	.56	1.0
72 SHAT. SLAB	LOW	1 (SLABS)	.56	2.5
74 JOINT SPALL	LOW	2 (SLABS)	1.11	.8
74 JOINT SPALL	MEDIUM	8 (SLABS)	3.33	3.4
74 JOINT SPALL	HIGH	11 (SLABS)	4.44	12.4
75 CORNER SPALL	LOW	4 (SLABS)	1.67	.7
75 CORNER SPALL	MEDIUM	8 (SLABS)	3.33	2.3
75 CORNER SPALL	HIGH	2 (SLABS)	1.11	1.6

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 24.78 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 13.04 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 62.19 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - SOUTH RAMP
Branch Number - A5B
Section Number - 1 Family - DEFAULT
Section Length - 2100.00 LF
Section Width - 300.00 LF
Section Area - 630000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 25 RATING = V. POOR

TOTAL NUMBER OF SAMPLE UNITS = 126
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 15
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 8
RECOMMENDED MINIMUM OF 23 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 12.2%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
41 ALLIGATOR CR	LOW	100.00 (SF)	.02	7.0
41 ALLIGATOR CR	MEDIUM	1773.33 (SF)	.28	18.1
41 ALLIGATOR CR	HIGH	3146.67 (SF)	.50	29.7
42 BLEEDING	N/A	86536.66 (SF)	13.74	43.7
43 BLOCK CR	MEDIUM	175582.80 (SF)	27.87	33.1
43 BLOCK CR	HIGH	10033.33 (SF)	1.59	22.9
48 L & T CR	LOW	9954.07 (LF)	1.58	6.3
48 L & T CR	MEDIUM	21398.87 (LF)	3.40	20.8
48 L & T CR	HIGH	11066.67 (LF)	1.76	25.6
49 OIL SPILLAGE	N/A	717.00 (SF)	.11	2.0
50 PATCHING	LOW	11154.93 (SF)	1.77	5.1
52 WEATH/RAVEL	LOW	281400.00 (SF)	44.67	19.4
52 WEATH/RAVEL	MEDIUM	248333.30 (SF)	39.42	38.0
52 WEATH/RAVEL	HIGH	4720.00 (SF)	.75	14.0
53 RUTTING	MEDIUM	114.00 (SF)	.02	13.0

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 22.70 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 62.00 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 15.30 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - SOUTH RAMP
Branch Number - A6B
Section Number - 1 Family - DEFAULT
Section Length - 450.00 LF
Section Width - 300.00 LF
Section Area - 135000.00 SF

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 30 RATING = POOR

TOTAL NUMBER OF SAMPLE UNITS = 54
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 10
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 10
RECOMMENDED MINIMUM OF 29 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 16.8%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
43 BLOCK CR	LOW	456.00 (SF)	.34	5.5
43 BLOCK CR	MEDIUM	29188.00 (SF)	21.62	30.3
43 BLOCK CR	HIGH	23407.50 (SF)	17.34	48.8
45 DEPRESSION	LOW	256.20 (SF)	.19	.7
48 L & T CR	LOW	1430.30 (LF)	1.06	5.1
48 L & T CR	MEDIUM	3544.30 (LF)	2.63	18.1
48 L & T CR	HIGH	868.00 (LF)	.64	16.1
49 OIL SPILLAGE	N/A	153.00 (SF)	.11	2.0
50 PATCHING	LOW	2156.50 (SF)	1.60	4.8
50 PATCHING	MEDIUM	2780.00 (SF)	2.06	12.6
52 WEATH/RAVEL	LOW	115672.00 (SF)	85.68	24.9
52 WEATH/RAVEL	MEDIUM	8500.00 (SF)	6.30	16.9
52 WEATH/RAVEL	HIGH	1000.00 (SF)	.74	13.9
53 RUTTING	MEDIUM	9076.00 (SF)	6.72	39.2

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 16.40 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 82.47 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 1.13 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST RAMP
Branch Number - A7B
Section Number - 1 Family - DEFAULT
Slab Length - 20.00 LF
Slab Width - 20.00 LF
Number of Slabs - 2239

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 80 RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS = 234
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 30
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 22 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 11.9%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
65 JT SEAL DMG	LOW	2164 (SLABS)	96.67	2.0
65 JT SEAL DMG	MEDIUM	74 (SLABS)	3.33	7.0
67 LARGE PATCH	LOW	59 (SLABS)	2.67	2.0
69 PUMPING	N/A	238 (SLABS)	10.67	10.4
70 SCALING	LOW	22 (SLABS)	1.00	.5
71 FAULTING	LOW	7 (SLABS)	.33	1.0
73 SHRINKAGE CR	N/A	14 (SLABS)	.67	.6
74 JOINT SPALL	LOW	216 (SLABS)	9.67	3.4
74 JOINT SPALL	MEDIUM	29 (SLABS)	1.33	1.9
74 JOINT SPALL	HIGH	7 (SLABS)	.33	3.0
75 CORNER SPALL	LOW	52 (SLABS)	2.33	.9
75 CORNER SPALL	MEDIUM	14 (SLABS)	.67	.8

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = .00 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 26.93 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 73.07 PERCENT DEDUCT VALUES.

INSPECTION REPORT

Network ID - RGRAY
Branch Name - EAST RAMP
Branch Number - A8B
Section Number - 1 Family - DEFAULT
Slab Length - 15.00 LF
Slab Width - 12.50 LF
Number of Slabs - 2960

Inspection Date: NOV/02/1995
Riding Quality : Safety: Drainage Cond.:
Shoulder Cond. : Overall Cond.: F.O.D.:

PCI OF SECTION = 83 RATING = V. GOOD

TOTAL NUMBER OF SAMPLE UNITS = 114
NUMBER OF RANDOM SAMPLE UNITS SURVEYED = 30
NUMBER OF ADDITIONAL SAMPLE UNITS SURVEYED = 0
RECOMMENDED MINIMUM OF 15 RANDOM SAMPLE UNITS TO BE SURVEYED.
STANDARD DEVIATION OF PCI BETWEEN RANDOM UNITS SURVEYED = 10.0%

*** EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION ***

DISTRESS-TYPE	SEVERITY	QUANTITY	DENSITY %	DEDUCT VALUE
62 CORNER BREAK	LOW	23 (SLABS)	.78	.7
63 LINEAR CR	LOW	61 (SLABS)	2.09	2.2
63 LINEAR CR	MEDIUM	27 (SLABS)	.92	1.0
65 JT SEAL DMG	LOW	928 (SLABS)	31.37	2.0
65 JT SEAL DMG	MEDIUM	1845 (SLABS)	62.35	7.0
65 JT SEAL DMG	HIGH	92 (SLABS)	3.14	12.0
66 SMALL PATCH	LOW	3 (SLABS)	.13	.2
67 LARGE PATCH	LOW	143 (SLABS)	4.84	3.0
67 LARGE PATCH	MEDIUM	7 (SLABS)	.26	2.5
71 FAULTING	LOW	23 (SLABS)	.78	1.0
71 FAULTING	MEDIUM	23 (SLABS)	.78	2.0
72 SHAT. SLAB	LOW	7 (SLABS)	.26	2.5
72 SHAT. SLAB	MEDIUM	3 (SLABS)	.13	5.0
73 SHRINKAGE CR	N/A	38 (SLABS)	1.31	.8
74 JOINT SPALL	LOW	73 (SLABS)	2.48	1.6
74 JOINT SPALL	MEDIUM	7 (SLABS)	.26	1.0
74 JOINT SPALL	HIGH	3 (SLABS)	.13	3.0
75 CORNER SPALL	LOW	34 (SLABS)	1.18	.5
75 CORNER SPALL	MEDIUM	3 (SLABS)	.13	.8
75 CORNER SPALL	HIGH	3 (SLABS)	.13	1.2

*** PERCENT OF DEDUCT VALUES BASED ON DISTRESS MECHANISM ***

LOAD RELATED DISTRESSES = 22.84 PERCENT DEDUCT VALUES.
CLIMATE/DURABILITY RELATED DISTRESSES = 42.04 PERCENT DEDUCT VALUES.
OTHER RELATED DISTRESSES = 35.12 PERCENT DEDUCT VALUES.

REPORT DOCUMENTATION PAGE

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12a.DISTRIBUTION/AVAILABILITY STATEMENT
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12b.DISTRIBUTION CODE

13.ABSTRACT ***(Maximum 200 words)***

An airfield pavement investigation was performed in November 1995 at Robert Gray Army Airfield, Fort Hood, Texas, to develop information pertaining to the structural adequacy of the airfield pavements for continued use under current mission and upgrading of the pavements for mission changes. The pavement surface condition was evaluated by use of the pavement condition index (PCI) condition survey procedure, and a nondestructive evaluation procedure was used to determine the load-carrying capability of the pavements and overlay requirements for continued use of the pavements under current missions. Results of the evaluation are presented including: (a) a tabulation of the existing pavement features, (b) the results of the nondestructive tests performed using a falling weight deflectometer, (c) the PCI and rating of the surface of each pavement feature, (d) a structural evaluation and overlay requirements for rigid and flexible pavement (4,900 passes and 2,600 passes of the B-747 aircraft, respectively), (e) the pavement classification number for each pavement facility, and (f) maintenance and repair recommendations based on the structural evaluation and condition survey.

14.SUBJECT TERMS
See reverse.

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154

16.PRICE CODE

17.SECURITY CLASSIFICATION OF REPORT	18.SECURITY CLASSIFICATION OF THIS PAGE	19.SECURITY CLASSIFICATION OF ABSTRACT	20.LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED		

14. (Concluded).

Aircraft classification number
Allowable gross aircraft load
Nondestructive testing
Overlay requirements
Pavement classification number
Pavement condition index
Robert Gray Army Airfield